Index of the Central Waterways, Irrigation & Navigation Research Stn., Poona 1, Annual Report (Technical), for 1944-1948.

Note:—Questions dealt with by The Director, but not described in Annual Reports are marked with an asterisk,\*

<b>A</b>	Pages of Annual Report (Technical) for the year					
<b>A</b>	1944	1945	1946	1947	1948	
Abrasion-attrition-degradation of sand.		. •••	· •••		ti Ti	
Accretion in N. W., Rice and Dadu Canals at Sukkur.	6,99	•••	•••	•••	: : !**	
Accretion of the river bed at Sukkur Barrage—causes of—an I how to reduce rate of rise—Part II.	<b></b> .	59-66	137	•••	•••	
Afflux—due to the proposed extention of the outer bank of approach channel—Experiments to improve flow conditions in approach channel upstream of Sukkur Barrage, Indus River.	•••	***	25	•••		
Afflux—reduction of, at Luni River Railway Bridge No. 3, of the Samdari—Raniwara Branch of the Jodhpu'r Railway.		•••	53	•••	••	
Alexandra Bridge over the Chenab River near Wazirabad—steps required to prevent damage to the	3*,5	•••	•••	<b>65</b>		
Anal, sis—Technical—of available data re: the rise of water levels of the Indus in the past and to be anticipated in future.	6,9)	•••	•••			

A	Page		ual Repo the year	rt (Tech	nical)
	1944	1945	1943	1947	1948.
Apparatus for generating waves in a model.		•••		•••	15
Approach Channel—Preventing slips of the right bank of Indus River below the nose of approach Channel ups:ream of Sukkur Barrage	••-	•••	17	•••	•••
Approach Channel at Sukkur- Design of off-take at the entrance of the right pocket from the		•••	93	•••	***
Apron-Design of to protect the truncated nose, with maximum depth of scour- Inlus River above Sukkur Barrage.	<b></b>	•••	24	•••	<b>*••</b>
Apron design for the South Guide Bank of the Alexandra Bridge on the Chenab River N. W. Railway,				5	<b></b>
Aqueduct No. 23 of the Nira Right Bank Canal—Fluming of	• • • • • • • • • • • • • • • • • • •	•••	112	*	•••
Assam Access Road—prevention of Scour in Garang River on—	3≉	•••	•••		; <del></del>
Assam, Neamati in-Prevention of erosion at-	3*		17	· <b></b>	•••
Attracting groyre—Revetment acts as	2, 104		•••	***	•••
Attracting island—Bukkur island in the Indus acts as	97	•••	96	•••	n eren eren Monaroka

A. & .B	Pages of Annual Report (Technical) for the year					
	1:41	1945	1916	1947	1948	
Attracting Islands to reduce turbulence in the Hooghly River d/s of the Kunckle at Titaghar Jute Mill.	•••		<b>E3</b>	•••	•••	
Attracting Spurs—the use of— for training a river upstream of a bridge or a Barrage.	97	en a	•••	5	•••	
Attrition—Rate of attrition of sand in channels.	•••	600	1.15	•••	17	
Augmentation of Bombay Water Supply,	•••	•••	137	•••	***	
Auranga River, Training the  -to protect Bhadeli village, District Surat (Bombay).	3*	• • •	•••.	51	₹ <b>₫</b> ♠ 、	
Automatic feed for maintaining a constant water level.	€5	•••	***	•4•	490	
Automatic gates spillway for the Tansa Dam—Determing- tion of the coefficient of dis- charge of the	•••	29.35	•••	153	•••	
В						
Baffle Fall—Hurdling over—	30	•••	***	•••	***	
Baffle platforms below S-W.F. s—Design of—	38	•	•••	•••	***	
Baffles - to dissipate energy below S.W F. s—Design of—	<b>3</b> 9	•••	•••	•••	<b>咖啡</b> 教	
Bagaha-Gandak River at— on the Oudh & Tirhut Rail- way which has outflanked the brilge-how to divert the —to its original course through the brilge.	10	••		2	•••	

В	Pages of annual Report (Technical) for the year					
	1944	1945	1946	1947	1919	
Bakshi Khal.	13	•••	<b>.</b> j.	•••	•••	
Balta Jheel, & Solani Khadir schemes in U. P. — Wodel experiments in connection with—	59	•••	•••	•••	•••	
Baluchistan— Protection of retaining walls from scour by means of repelling Spurs.	***	8	•••	***	•••	
Barrage— Effect of constructing a—across a river, on bed levels and water levels u/s & d/s, with particular reference to the Indus (Sind).	99	•••	•••	<b></b>	•••	
Barrage—Lower Sind Barrage on In lus at Kotri—design so as to exclude sand from ent- ering the canals at	<b></b>	•••	98	116	••'	
Barrage—Design of Lower Sind Barrage on Indus at Kotri— Optimum shape of the nose	•••	•••	110	••••	•••	
of central island at Kotri.	•••	•••	125	•••	•••	
Barrage—Lloyd Barrage at Sukkur on Indus—to control sand entering the canals taking off the					,	
Barrage—Lloyd Barrage at Suk- kur on Indus — midseason scouring operations of the in the interpretation in the	•••	•••	•••	61	••• •••	
Barrage - Scour below Kotri Barrage.	***	•••		72	•••	
Barrage — Scour round divide wall noses of Ko.ri Barrage.	<i></i>	•••	•••	73	***	

В	Pages of anunal Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Barrage — proposed design of Lower Sind Barrage—Long pocket versus short pocket.	bae	•••	•••	120		
Barrage proposed at Kotri—design of right and left pocket divide walls.		. <b></b>	•••	125	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
Barrage proposed at Kotri— Comparisons of velocities during scouring operations with different number of left pocket spans.			•••	130	•••	
Barrage proposed at Kotri- "Still pondor semi open flow" regulation and consquent height of pocket gates.	•••	•••	•••	134	•••	
B. B. and C. I. Railway bridge at Broach—scour caused by left bank groyne.	77,85	***	•••	•••	•••	
Beki, Balkadoba and Manas Rivers-How to train and centrol the-	3,69	•••	•••	•••	•••	
Bell-mouth entrance of flumes and falls-side contractions and humps-	29,32	• • •	•••	•••	•••	
Bhandardara Waste Weir to raise the retention level—Siphons and gates for	•••	•••	•••	•••	95	
Bhivpuri scheme recommended for the augmentation of Bombay Water Supply.	74	•••	•••	•••		
Bihar—Son river at Dehri—sand drawn by the canals and Undersluices u/s of the anicut.	58	***	101	•••	•••	

В	Pages of Annual Report (Technical) for the year						
	1914	1945	1943	1947	1948		
Birla Jute Mill on the Hooghly River—Erosion at	٠.,	•••	•••	•••	-57		
Pombay Presidency — Raising the waste weir at Lake Arthur Hill, Bhandardara, with High Coefficient weir.		***	27	•••	•••		
Bombay City Water supply— Augmentation of—	6, 70	•••	137	153	***		
Bombay foreshore—Prevention of erosion on and reclamation of land bearing S. No. 71, part of Juhu and creek—land.	l*	•••	•••	•••	***		
Bridges—Dissipation of energy below		***	139	•••	***		
Bridge—depth of foundations for bridge piers.	.,.	***	14	•••	<b>+00</b> C		
Bridges - maximum depth of scour do wastream of		•••	140	69			
Bridge - maximum depth of scour at the heads of guide- bank & shanks, at the pro- posed C. K. Railway Bridge over Ramaganga River.			13	•••	• • • •		
Bridge-waterway required for Jodhrur Railway Bridge over Sukri River.		•••	37	•••			
Bridge—waterway required for Jodhpur Railway Bridge over Sagi River.		•••	37	•••			
Bridge Alexandra on the N. W. Railway—Apron design for south Guide Bank on the Chenab River—		•••	•••	65			

В	Pages ef Annual Report (Technical) for the year						
	1944	1945	1943	1947	1948		
Bridges - scour at Guide banks.	·	•••	•••	70	465		
Bridge on Beas river near Beas Station on the N. W. Railway on Lahore-Ludhiana section.	2*		•••	***	<b>, •••</b>		
Bridges on Madras Bombay line of M.&S.M. Railway between miles 82 & 113-protective measures of	•••		•••	52	•••		
Bridge piers - scour round		•••	129	***	••		
Bridge over Ganga River at Patna or Mokameh Ghat- proposed for combined Road and Railway Bridge-	•••	•••	••• /	203	•••		
Broach-scour caused by left bank groyne of the B. B. and C. I. Railway Bridge at-	<b>77,</b> 85	•••	•••	•••			
Bruckner curve for sunspot numbers.		86-87		***	•••		
Brushwood groynes, effective in eliminating "bellies" and return flow with "jetting" prevented by lowering pavement.	- <b>25</b>	•••		•••	•••		
Bukkur island in the Indus acts as an ATTRACTING island.	97	***	•••	***	4**		
Bulk proportionality and height of hump-Relation between-	44	•••	•••	_	• #•		
Bunds—River bunds in Sind—causes of breaches in	•••	•••	•••	129			
<b>c</b>							
Calibration of a flumed bridge near Pimpra on the Nira L B. Canal in Bombay Province.	4*	•••	Tra .				

C	Pages of Annual Report (Technical)  for the year						
	1944	1945	1946	1947	1948		
Canals, eradication of weeds from—Juring closures.		•••	124	•••			
Canals—Rivers and canals—flow in channels in incoherent & coherent alluvium.		1	85		900 5		
Canals—Exclusion of sand from entering the canals at Lower Sind Barrage on Indus at Kotri.	•••	400 A-L	98	116			
Canals-Remodelling of	•••	•••	123	•••	•••		
Causes of accretion of river bed at Sukkur Barrage and how to reduce rate of Rise, Part I.	\$9	<b></b>	••• 	•••	-		
Causes of accretion of the river bed at Sukkur Barrage and how to reduce rate of rise-Part II.	***	<b>59</b> -66	••• •••	•••	•••		
Causes leading to erosion of the left bank of the Rup- narain River u/s of the Kola- ghat bridge on the B. N. Rail- way.	14		***	•••			
Cawnpore Electric Supply Corporation—How to secure an adequate supply of water for the river-side power station of the—	3*	•••	•••	•••	***		
Central island or spur for river training.	97		>	•••	•••		
Ceylon-advice regarding pro- bable maximum run—off from catchments in—	2*				***		

${f c}$	Pages of Annual Roport (Technical for the year						
	1944	1945	1946	1947	1948		
Ceylon — advice regarding waterway of bridges in -	2*	•••					
Channels - alluvial - factors affecting flow in	•••		134	:			
Channels — Factors affecting silting & scouring of	<b></b>	··· .	132				
Chenab river near Wazirabad – Alexandra Bridge over the— steps required to prevent damage to the	3**, <b>5</b>	•••	11 (15 T) 1 T	65			
Cistern - Design of - below flumes.	36, 40	<b>90h</b> (**	***	*** <sub>2</sub> v.			
Closing of spills on right bank u/s of Hope Bridge led to heavy erosion of the Rander Road.	87	, , , , , , , , , , , , , , , , , , ,	(1. defects)				
Cochin Harbour Model - Preli- minary note on	<del></del> .	***	•••	91			
Cochin Harbour - Formation of mud banks at. Extracts of		•••	•••	92			
Report of the Special Committee 1938.	.·.	A 30 (1)					
Cochin Harbour - movement of mud banks at		•••	•••	112			
Cochin Harbour - Notes on Tides near	•••	•••		11.5 <sub>1</sub> × 1			
Cochin Harbour - Preliminary Report on improvement of - by K, K Framji & T M. Oag (1947).	, . <b>.</b> .	• • • • • • • • • • • • • • • • • • •	e ge t	11.4 g			
Cochin Harbour Model - design of scales,	* !	**************************************	1	102-			

C	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Coefficient for conversion of sur- face velocities to mean velo- cities in natural streams.		( <b></b>	•••	of the sq.	1	
Coefficient of discharge of Ga- nesh Iyer's volute siphon – Factors effecting the –		72-78	•••		, , , , ,	
Coefficient of discharge of Standing Wave Flume.		92	•••	•••	•••	
Coefficient of discharge of Stand ing Wave Flumes Effect of piers on		94	•••	•••	•••	
Coefficent of discharge of Nira L. B. Canal Head Regulator.	•••	95	•••	•••	7 19	
Ccefficient of discharge of Notch type and weir type falls on the Mahanadi Main Canal (C, P.)	<b>.</b>	***	e de la cr	<b>23</b>	  	
Coefficient of discharge of the automatic gates spillway for the Tansa Dam - Determination of the -		29-36	•••	•••	ì	
Collapse of RohriMultan Road Bridge over Rohri canal at R. D. 52,000 in Sind - Preven- tion of -	3*		•••		44	
Comparison of sites for the Lower Sind Barrage.	55	; ••.	1	A CONTRACTOR OF THE CONTRACTOR	. D.	
Comparison of Various Schemes for the augmentation of Bombay Water Supply.	71	••••	1	***************************************	32 1	
Construction of a 500 cs. Standing Wave flume in Jodhpur State.	2*	* • • • ·	Aug a	L Little		

C	Pages		ual Repo		hnical)
	1944	1945	1946	1947	1948
Control blocks & deflectors in flumes - Design of -	36	•••			(i)
Control, how to and train the Beki, Balkadoba and Manas Rivers on B & A Railway (Assam).	3.69	2 ***		) (120 le (120 le (20 le (120 le	
Controlling sand entering canals - Design of Lower Sind Barrage at Hajipur -	57	•••	***		The second secon
Control of erosion of Kshipra river at Ujjain.	2*,6	•••		•••	•••
Control of sand entering the canals taking off the Lloyd Barrage at Sukkur.	•••	•••	126	•••	. ja . ja • • • • • • • • • • • • • • • • • •
Control of sand entering the Mithrao & Khipro Canals—Ex-Nara River at Makhi, Sind	•••	•••	, 127	<b>4</b>	Confidence Confidence
Controlling the sand entering the canals-off Son Anicut at Dehri (Bihar).	58		•••	•••	 
Crump's original design of S. W. F.	29	•••		•••	### **********************************
Culverts - road. Design of vent approaches & exits.	,	1 / • • • • • • • • • • • • • • • • • •	37	•••	
Curvature of flow - in a parallel sided 5' wide S. W. F. under various stages of flow.	••• •••	•••	88	••• .*	Description
Curvature of flow-in rivers and canals for controlling sand entering canals and training of tidal and non-tidal waters.	•••	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	125		1000 1000 1000 1000 1000 1000

C & D	Pages of annual Report (Technical) for the year						
	1944	1945	1946	1947	1948		
Cut-off ceannel - new-factors favourable for opening a- (i) curvature of n/s;	63	•••	· <b>···</b>				
(ii) relative slope d/s of tho bifuracation; and (iii) relative discharge.							
Curvature of flow.	7,8,10, 13,20, 23,55, 58,69. 74,84, 87,57,	5,7,11, 19,43, 48, 83. 96,	5,17 38,42, 44,52, 60,64, 68,98	34,35, 39,43, 46,47, 54,65, 83,116, 134.177, 179,187			
Cutch State - possibility of bringing Indus water to		•••	•••	219	14 2 1 L		
Cuttack, Orissa - Katjuri and Mahanadi group of rivers near - Experiments with a model of the -	•••	19	44	35	•••		
Damage in 1944 to the Surat Rander Road and the City wall of Surat d/s of the Hope -Bridge at Surat and recom- mendations to ameliorate pre- sent conditions.	87	•••	•••	•••	•••		
Damage to lands bordering on the Tapti, Narbada and Sabar- mati rivers during 1944 flood	•••	84	•••	•••			
Damodar River Flood Enquiry Committee (Proposals to prevent a recurrence of damage resulting from breaches)—by Government of Bengal and Technical and Joint Committee appointed by the Govern-	5,6,13	•••	•••	•••			

D 1 o	Pages of anunal Report (Technical) for the year					
the second of th	1944	1945	1946	1947	1948.	
Damodar River, Bengal—proposals to prevent a recurrence of damage resulting from breaches in the -	3*	eluger vi		14 (0 10)	- त : !	
Damodar River—Transmission coefficient of the sand samples from the bed of, at Sindri.	÷ i		94	···	•••	
Damodar River -Floods & their control.	•••		133	•••		
Danger of water—logging in the Eastern Nara Tract in Khairpur State in Sind.	3*	······································	• • •	is go	•••	
Darkeswar river.	13	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	•••	•••		
Dates of beginning of depletion from Lake Tansa. Bombay—years 1896 to 1944.	7		•• •• •• •• ••	•••	***	
Dates of break of monsoon at Tansa Lake Tansa, (Bombay)- years 1896 to 1944.	73	201	 VOD (1)	•••	•••	
Datum area 1,000 ft. d/s of Sukkur Barrage before Right Bank approach channel was constructed and after.	102		is:	••• 		
Deep scour d/s of the N. W. Railway B idge over the N. W. Canal near Ruk, Sind- Experiments carried out to evolve a suitable design of	23		 		iner oth	
pavement and side expansion to induce accretion.						
Deflecting groyne — Measures taken to control erosion of the left bank of the Rupnarain u/s of the B. N. Railway Brid- ge at Kolaghat by means of a-		5-7		i io o silisa o Silisa o Siliyati		

D	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948.	
Dehri-Groyne with a regula- tor to reduce sand entry from M. W. Canal at-	58			-	To the second se	
Dehri on the Son (Bihar) Pre- vention of scour d/s of sluices	20	•••		•••		
Dehri on Son (Bihar)—sand excluding heads for the M. E. Canal & M.W. Canal on the—	58		•••		22.4 2. 32.3 2. 32.3 3. 32.3 3	
Dehri Son (Bihar)—Coeffcient of discharge of weir.	58	•••	•••	•••	•••	
Delhi Gate Pumping Station— Training of Jumna River at, with pitched embankment on the right bank.	••• 21	43-48		•••		
Delhi-Training of the Jumna at Delhi Gate Pumping Sta- tion,	8	des	•••	•••	•••	
Delhi Water Supply Committee appointed by the Government of India.	5	•••			***	
Depth of scour—maximum, for apron, protection at the truncated nose of extended outer bank of approch channel in the Indus above Sukkur Barrage.	<b></b>	•••	24			
Depth of scour—maximum, at the heads of guide banks— Ramganga River at proposed C. K. Railway Bridge.		***	13			
Depth of scour—maximum at the shanks of proposed C. K. Railway Bridge over Ram- ganga River.		•••	13			

D.	Pages ef Annual Report (Technical) for the year					
	1944	1945	- 19 <b>4</b> 6	1947	1948	
Depth of scour—maximum at Bridge section R amganga	••••	***	14 -	•••	•••	
Riverat proposed C. K. Rail- way Bridge.					, ,	
Depth of foundation for Bridge piers at the proposed C. K.		•••	14		•••	
Railway Bridge over Ram- ganga River.						
Design of a stilling basin d/s of the overflow section of the	2*	•••		•••	••	
of the main Erinpura Dam in Jodhpur State.	•				·	
Design of approach channel of Flumes and Falls.	31	<b></b>		•••	•••	
Design of canals, in Sind, Part I—New canals and Part II—Jnundation canals.	•••	•••	136		•••	
Design of Channels u/s of S. W. F. s	31	•••	•••	•••	**2	
Design of canals—comparative analysis of sand by Puri sand—meter and Air sandmeter.		•••	•••	25	•••	
Design of cistern below flumes	36,40	•••	••• .	•••	904	
Design of downstream portion of S. W. Flumes, standard	35	•••	•••	***	•••	
design—where very high recovery of head is not essntial.						
Design of downstream portions of S. W. Flumes, standard	37	•••	•••		••1	
design—where it is important to lose as little head as						
possible.			1	<b>.</b> 	• • • • •	

	Pages of Annual Report (Technical) for the year						
D	1944	1945	1946	1947	1948		
Design of guide banks and divide walls downstream of the new undersluices of the Son at Dehri (Bihar)	22	₹ ***±:		•••	••		
Design of the Lower Sind Barrage-Experiments to test the design for scour and sand exclusion from canals—Sind.	•••	48-59	127	116,	•••		
Design of new canals in Sind -recomendations for bed width, depth, slope.	*a#	frace fr	a:	l .	•		
Design of off-take at the entrance to the right pocket from the approach channel at Sukkur.		96	•••		•••		
Desilting and dredging of Tanks in Sangli State.	2*	• • • •		•••			
Determination of the coefficient of discharge of the automatic gates spillway for the Tansa Dam.	,	29-36			•••		
Determination of the variable coefficient of the 10,595 cs. Tando Mastikhan Fall on the Rohri Canal, Sind.	••• •••	94		•••	•••		
Device to ensure stilling before water is let into a model.	105	•••	•••	;•••	•••		
Difficulties experienced in river model experiments due to effects caused by vertical exaggeration.	•••	•••	110-	•••	•••		
Dimna Nala overflow spilway -Jamshedpur water Supply Scheme-Remodeling of the	• • • • • • • • • • • • • • • • • • •	•••	•••	<b>9-9</b>	21 <b>116</b> 6		

D	Pages of Annual Report (Technical) for the year					
, ,	1944	1945	1946	1947	1948	
Discharge - Accuracy of different methods of taking discharges.		•••	86	•••	•••	
Discharge measurement — coefficient of discharge in Notch type and weir type falls on the Mahanandi Main	•••	•••	•••	23	•••	
Canal (C. P.)  Discharge Table of S. W.  Flumes and Falls.	34	•••	• •••	•••	•••	
Dispersers—to prevent scour below volute Siphons by fanning out the siphon jets.		•••	•••	165	•••	
Disposal of Poona Sewage by irrigation.	,,,	•••	123	•••	•••	
Dissipation of energy below falls.	29	•••	139	167	•••	
Dissipation of the energy below the proposed Vaitarna dam pillway (Bombay) - Experi- ments for	•••	•••	•••		104	
Dissipation of energy d/s of Lower Sind Barrage (2400 ft. u/s of site B near Hajipur) – Experiments in connection with—	•••	9-11	-	•••	***	
Dissipation of energy of flow of the jets issuing from "Ganesh Iyer" Volute siphon by mutual impact of jets.	•••	•••	91	•••	***	
Divergence from regime in stable channels in alluvium - Note on, by the Director.	•••	••	135		•••	

D & E	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Downstream expansions—Rectangular Hyperbolic U. P design adopted in flumes and falls.	35, 37, 40	- ***	•••	•••		
Drainage channels of the Damodar River.	13	•••	•••	***		
Dunbar Cotton Mill - Training the Hooghly River at - with a bypass channel.	·	11-18	•••	•••		
Dunbar Mill - Longitudinal and cross row of piles at the -to enable accretion and silting to take place.	. 7			•••		
Dunbar Mill on the Hooghly— Erosion of bank near the, how to prevent, by a tidal model.	7	•••	***	***	•••	
<b>E</b>	1	-				
Eastern and Western Jumna Canals— Headworks at Taje- wala.	91		•••	***	•••	
Effect of constructing a barrage across a river on bed levels and water levels u/s and d/s with particular reference to the Indus (Sind).	99	•••	•••	•••	•••	
Effect of constructing a trench d/s of a soil dam on the saturation line,	61	•#•	•••	•••	•••	
Effect of high level bridge pavement on scour d/s of the Railway bridge on the N. W. canal at Ruk, Sind.	23	•••	•••	•••	•••	

E	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Effect of shape of catchment on the run-off.	<b>6</b> 8	•••	•••	•••	•••	
Effect of staunching due to silting upstream of the Solani dam.	63	•••	•••	•••	•••	
Effect of storages in Tons and Giri catchments on supplies in the Jumma during flood season and regeneration in the fair season.	94	•••	•••	•••		
Effect of variation of u/s and d/s water levels of the Solani Khadir dam model on Hydraulic gradients or saturation lines.	61	••• • *** • • • • • • • • • • • • • • •	•••		•••	
Effect of shortening Barrage on accretion in the Indus d/s of Sukkur Barrage.	3	•••	•••	•••	4 4/4	
Effluent Experimental Farm-disposal of Poona sewage by irrigation.	•••	•••	123	•••	•••	
Embankment near Nanpara (U.P.) to divert the whole of the Saraju river into the Gograi, thus preventing spill flowing into the Saraju Tirhi channels.	2*	•••		•••	•••	
Embankment-pitched, to attract flow at the Delhi Gate Pump House on the Jumna River.			60	•••	•••	
Emergent measures for preventing serious damage to the central sluices of the Mahanadi Anicut at Cuttack Orissa.	•••	•••	27	34		

E	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Energy - dissipation below Gtanding Wave Flume Falls.	29	•••		•••		
Energy-dissipation of energy of jets issuing from Ganesh Iyer Volute Siphon by mutual impact of jets.	***	•••	91	•••	•••	
Engineering Congress (Punjab) Paper 275 (1945) "River Training and Control by Piched ('Attracting') islands".	97	•••	•••	•••	•••	
Equivalent size and specific gravity of stones and blocks in a model.		115-	•••	•••	•••	
Eradication of water weeds from Canals.	•••	•••	124	•••	•••	
Erinpura Irrigation and Hydro- electric Project Siphon spill- ways in Jodhpur State.	2*	•••	•••	•••	•••	
Erosion - bank, on Auranga at Bhadeli & Bhagda villages (Bombay Presidency) - Mea- sures arresting the	•••	•••		51	•••	
Erosion at Neamati in Assam Prevention of	3*	•••	•••			
Erosion at Vizagapatam fore- shore-prevention of-	3*	•••	•••	•••	•••	
Erosion in the Narbada at Borbhata downstream of Railway Bridge near Broach - Prevention of	<b></b>	•••			51	

E	Pages of Annual Roport (Technical) for the year					
	1944	1945	1946	1947	1948	
Erosion just u/s of the B.N.Rly. Bridge over the Rupnarain River-How to check dan- gerous-	2*, 5	•••		•••	•••	
Erosion of Spur 2 in the Indus River near Umerkhel-action te be taken regarding	3*	•••	•••	/ :	•••	
Erosion-Prevention of- on Bombay Foreshore and reclamation of land bearing S. No. 71, part of Juhu and Creekland.	1	•••	•••	••• ·	•••	
Estimated depth of scour at bends.	75	•••	•••	***	***	
Estimation of the maximum flood discharge during 1944 by various methods and comparison with the fan catchment formulae.	89	•••	•••	•••	• • • •	
Excluders and Ejectors - Effec- tive exclusion of sand from canals at the proposed Lower Sind Barrage on Indus River at Kotri.	•••	•••	98	•••	•••	
Exclusion of sand from entering canals by construction of submerged vane at the proposed Lower Sind Barrage on Indus River at Kotri.		•••	101	•	•••	
Exclusion of sand by Central Island at the proposed Lower Sind Barrage on the Indus at Kotri.		•••	105	•••	• • •	

E & F	Pages of Annual Report (Technica for the year				
	1944	1945	1946	1947	1948.
Exclusion of sand-factors affecting the exclusion at the proposed Lower Sind Barrage on Indus at Kotri.	•••	•••	105	•••	•••
Exclusion of sand from canals taking off the Son river in Bihar.	. 58	•••	•••	•••	
Experiments in connection with dissipation of energy downstream of Lower Sind Barrage (2400 ft. upstream of site B near Hajipur).	<b></b>	9-11	•••	•••	
Experiments to determine a suitable profile of the Lower Sind Barrage to cause minimum afflux with gates fully open.	•••	22-29	•••	•••	•••
Experiments with a veritcally exaggerated model (1/400: 1/66) of the Mahanadi and its branches at Cuttack (Orissa).	•••	19-22		•••	<b></b>
F				•	
Factors affecting the coefficient of discharge of Ganesh Iyer's volute siphon.	•••	72-7×	•••		•••
Factors affecting slope in all- uvial channels.	<b></b>		134	•••	•••
Factors favourable for opening a new cut-off channel.  (i) Curvature of flow u/s  (ii) Relative slope d/s of the bifurcation.  (iii) Relative discharges.	69		•	* .	<b></b>

F	Pages of Annual Report (Technical) for the year					
<b>.</b>	1944	1945	1946	1947	1948	
Fair weather and freshet spring tides in the Rupnarain River at Kolaghat Rly. Bridge on the B. N. Railway in 1914 and in its mobile bed model.	17	•••		•••	•••	
Falli ng aprons-characterstics of		••	129	•••	• • •	
Falls on Mahanadi Main Canal (C. P.) - coefficient of discharge of Notch Type and Weir Type Falls -	•••	***	•••	13	•••	
Falls-dissipation of energy below		•••	139	167	••	
Falls, Flumed-scour d/s of		97	•••	•••		
Field results of measures adopted after model experiments.	•••	•••	5	•••	<b>333</b>	
Flood control.			131		•••	
Flood control-Floods in Damodar River.	•••	•••	133	•••	•••	
Flood control on Tapti River at Surat.	••-	•••	•••	54	•••	
Flood discharge - maximum, of Ramganga River for proposed C. K. Railway.	•••	•••	13		•••	
Flood protection measures for Nuna-Pothi Rivers in Orissa.	3*	•••	•••	•••		
Flood protection—Redistribution of sand load between the Mahanadi and Katjuri systems at Cuttack - Orissa.		19	44	35		

F	Pages of annual Report (Technical) for the year				
	1944	1945	1946	1947	1948
Floods, river-Sunspot inten- sity cycles as a medium of predicting the probable dates of occurrence of -	•••	86-67		•••	•••
Flumes - Dissipation of energy below.		•••	139	•••	•••
Flume Meter Baffle Falls- Design of downstream portion of-	35	•••	•••	•••	•••
Flume-Standing Wave Flume Design for the Jawai River Project ( Jodhpur ).		•••	85	•••	•••
Flume-Water surface profile in a 5 ft. wide S. W. F. with parallel sides, at various stages of flow.		•••	83	•••	
Fluming of Aqueduct 23 of the Nira Right Bank Canal.	•••		122	•••	•••
Flumed Falls - Scour downstream of -		97	***	•••	•••
Form drag of cylinders in connection with bridge investigation for Central Provinces.	4*	•••	•••	•••	•••
Forty cusecs Standing Wave Flume in the masonry conduit, taking off from the Haleji Reservoir — Karachi Water Supply scheme.	2*	•••	•••	•••	•••
Freshet spring and fair weather tide in the Rupnarian River at Kolaghat Railway Bridge on the B. N. Railway in 1914 and in its mobile bed model.	17	•••	•••	•••	•••

G	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Gandak River at Bagaha on the Oudh and Tirhut Railway which has outflanked the	3, 10, 13	•••	•••	•••	•••	
Bridge—How to divert the-to its original course through the Bridge.						
Gandak at Bagaha on the Oudh and Tirhut Railway - conditions leading to the outflanking of the Railway Bridge.	10		•••	•••	•••	
-DoDo - Chhitauni groyne acting as an 'attracting' spur in pulling the river round its nose.	10	•••	•••	•••	•••	
-Do Prediction of the future movement of.	13	••	•••	•••	• • • •	
-Do- Do sand on the bed of the.	11		•••	•••	•••	
-DoDo - use of the Missisippi formula for estimating the maximum flood discharge in the -in 1924.	12	***	•••	400		
Ganesh Iyer's volute siphon - Factors effecting the coefficient of discharge of -	•••	72-78	•••	•••	***	
Ganga River at Garhmukteswar- Training of.		- • • • •		•••	29	
Ganga at Patna ond Mokameh – Bestalignment for-Submarine Cables across the.		·••	•••		148	
Janga River - Safeguarding the Harding Bridge across-against the danger of outflanking,		•••	128	•••	**************************************	

G-	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Ganga River-Proposal for a combined Bridge at Patna or Mokameh Ghat over the		•••		203	•••	
Ganga River-Training the river at Kanpur,		•••		46	}   •••	
Garang River on Assam access Road - Prevention of scour in-	3*	***	40.0	•••	•••	
Geometrically—similar models which give geometrically—similar results.		92-95	•••	•••	•••	
Geometrically - similar models which do not give geometrically - similar results.	<b></b>	95-101	•••	/•••	•••	
Gibb module-Theory, design & construction of -		•••	122	•••	•••	
Giri and Tons catchments-effect of storages in-on supplies in-the Jumna during flood season & regeneration in the fair season.	94	•••	••-	• • •	•••	
Glacis slopes downstream of S. W. Flumes.	25	•••	•••	•••	•••	
Glacis slopes of Flume Falls.	38	•••	•••	•••	•	
Godavari Right & Left Bank canal Head Regulators (Bombay Presidency)— Experiments with		•••	122	•••	•••	
Godavari River at Rajahmun- dry-Protection of Railway Bridge Piers on the		•••	•••		5?	

. <b>G</b>	Pages of Annual Report (Technical) for the year						
ŧ,	1944	1945	1946	1947	1948		
Groyne, deflecting - Measures taken to control erosion of	•••	5-7	•••	•••	***		
the left bank of the Rupnarain upstream of the Bengal Nagpur Railway Bridge at Kolaghat by means of a—							
Groyne repelling - Proposal for protecting the left bank of the Rupnarain River u/s of the Railway Bridge at	15	***	•••	•••	•••		
Kolaghat on the B. N. Railway.	-						
Groyne & islands - control of flow, through bridges by means of	97	•••	•••	<b></b>	•••		
Groynes, attracting and repelling.	104	•••	•••	•••	•••		
Groynes, Brushwood, effective in eliminating 'bellies' and	<b>25</b>	•••	•••	•••	•••		
return flow due to 'jetting', prevented by lowering pavement.							
Groynes — Semi-permiable — construction and launching of		•••	66	•••	•••		
Groynes - Timber pile groynes.		•••	67	in d de se	••.		
Groynes—to train the Sutlej River at Samasata Railway Station, N. W. Railway.			72		•1•		
Groynes — permeable tree groynes to reduce attack on right bank upstream of B. N. Railway Bridge at Kolaghat.	•••	•••	78				

G & H	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Groynes - permeable tree groynes to train the Indus river at mile 21 of the Sukkur Begari Bund - Sind.		•••	81	•••	•••	
Groynes — maximum depth of scour at the head of		•••	140	•••	•••	
Groynes - for silting a byeriver at its off-take-Indus River opposite mile 5/3 of Kasimpur Nababshah Bund.	•••		83	•••	•••	
Guide Bank - Maximum depth of scour at the heads of		•••	140	•••	•••	
Guide Bank—design of the left guide bank of the Luni River Bridge on the Samdari-Rani- wara branch of the Jodhpur Railway.	•••	•••	59	•••	<b>***</b>	
Guide Bank-Maximum scour at Ramganga River - pro- posed bridge on C. K. Rail- way.	•••	•••	13	••• ·	<b></b>	
Guide Bank-Length of, necessary measures to prevent probable erosion of Railway Embankments.		•••	15	p. 4	•••	
Guide Bank design of -at the proposed Lower Sind Barrage at Kotri - Sind.	. <b>***</b>	•••	•••	122	•••	
Н						
Hajipur, Sind, Design of Lower Sind Barrage at	55		•••		•••	

Н	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Haleji Reservoir - Karachi water Supply Scheme-Forty cusecs S. W. F. in the	2*	•••	•••	•••	•••	
masonry conduit taking off from the						
Harbour—Preliminary note on model of Cochin—		• • •	•••	91		
Hardinge Bridge - over the Ganges (Bengal Assam Railway); protection against the danger of being outflanked.	•••	•••	128	•••		
Head Regulator - Godavari Right Bank Canal and Left Bank Canal-Increasing the capacity of		•••	122	•••	•••	
Head Regulator — Nira Left Bank Canal—Increasing the dlscharging capacity of	•••	•••.	122	•••	•••	
Headwork-Punjab practice of constructing	98	•••	•••	***	• • •	
High Coefficient Weirs.		99-101	141	***	•••	
High level stone pitching maintained at Hope Bridge near Surat distorted curvature of flow & caused damage upstream and downstream in 1944.	88		·			
Historical Account of the Indian Waterways Experiment Station, Poona (1916-46).	•••	•••	121	•••	•••	
History of the water supply of Bombay.	70	•••	•••		•••	

H	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1918	
Hooghly Estuary—Tidal Model of the		•••	: : :	•••	58	
Hooghly Model - Tide generating apparatus in the		***	•••	•••	73	
Hooghly River above Calcutta  - How to improve the -	3	••••	•••	•••	•••	
Hooghly River - Erosion at Birla Jute Mill on the		•••	•••	•••	57	
Hooghly River from Bansbaria down to reefs i. e. 15 miles below Saugor - Preliminary 1010 (n the design of scale ratios of the model of the	•••	•••	•••	•••	63	
Hóoghly river - Tidal model to prevent bank erosion near Dunbar and Titaghar mills.	3,7	•••	•••	•••	•••	
Hooghly River - Measures adopted to reduce turbulence in the river downstream of the knuckle at the Titaghar Jute Mill (Bengal).	•••	•••	38	83	•-•	
Hooghly River - Experiments with submerged row of piles at the knuckle at the Titaghar Jute Mill (Bengal).	•••	•••	39	•••	•••	
Hooghly rigid tidal models	•••	105-107	•••	•••	•••	
Hooghly River at Dunbar Cotton Mill - Training the - with a by-pass channel.	•••	13-18	•••	%. ••••	••• ,	
Hooghly semi-rigid tidal model (long),	•••	105	•••		***	

H & I	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Hooghly River - Experiments with "attracting" artificial Islands.			40	•••		
Hooghly River-protection of the foreshore of the Anglo- India Jute Mill on the	•••	•••	42	• • •	••	
Houghly River — Preventing erosion along the foreshore above Calcutta.		•••	130			
Hooghly semi-rigid tidal model (short).	·	106	•••	•••	•••	
Hope Bridge near Surat-clos- ing of spills on right bank u/s of-led to heavy erosion of the Rander Road.	88	• • •	•••	• • •	•••	
Hur Hura khal.	13	•••	•••			
Hurdling over Baffle wall.	<b>3</b> 0 ·	•••	•••	•••		
Hydraulic elements and constants—Nomograms for determining the		78-80			***	
Hydraulic gradient or satura- tion lines—effect of u/s and d/s Water levels of the Solani Khadir dam model on—	61	•••	•••	•••	•••	
I						
Increasing the discharging capacity of Regulators, Outlets & Aqueducts by fluming & remodelling.	•…	•••	122	•••	•••	
Indian Waterways Experiment Station, Historical Account of -1916-1646.	<b></b> .		121		•••	

I	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Indus River, training of -above Sukkur Barrage to prevent slips of the right bank below the nose of the Approach channel.	<b></b>	<b></b>	17	•••	•••·	
Indus and the Llyod Barrage at Sukkur - Experiments with a model of the, for sand control of the right bank canals.		<b></b>	26	61,177, 179	•••	
Indus, Sukkur - accretion in -	.6,99	•••		•••	•••	
Indus, Bukkur island, in the- acts as an 'attracting' island.	97	•••	•••	***	·••	
Indus River—Experiments to improve conditions in the Approach Channel.			19		•••	
Indus River-Stability of the proposed truncated nose for a super-flood of 9,00,000 cusecs in the 1/80 G. S. Model.		<b>,</b>	22	•••	•••	
Indus River - Maximum depth of scour for apron protection at truncated nose of Approach Channel.		•••	24		•••	
Indus River—Afflux due to the proposed extension of the outer bank of Approach Channel.		•••	25	•••	•••	
Indus River-Training of the River at mile 21 of Sukkur Begari Bund by means of per- meable tree groynes.	•••	·	<b>£1</b>		•••	

<b>T</b>	Pages of Annual Report (Technical) for the year					
e de la companya de la <b>k</b> erio. Managan de la filosophia de la companya de la comp	1944	1945	1946	1947	1948	
Indus River—Design of Lower Sind Barrage at Kotri, so as to exclude sand from entering		•••	98,127		•••	
canals.	`. <u>.</u>					
Indus River—Experiments with model, with & without proposed Lower Sind Barrage	<b>**•</b> *	•••	99	•••	•••	
at Kotri.						
Indus River - Factors affecting the exclusion of sand from the canals, at the proposed Lawer Sind Barrage at Matri	<b>,</b>	•••	105	•••	•••	
Lower Sind Barrage at Kotri.						
Indus River-Scale ratios of the Lower Sind Barrage model at Kotri.	•••	•••	107	•••	•••	
Indus near Umerkhel-action to be taken regarding erosion of spur 2 in the-	3*	•••	•••	•••	•••	
Indus-rate of rise of water levels in the-	99	•••	•••	•••	•••	
Indus (Sind) - effect of con structing a barrage across a river on bed levels and water levels u/s and d/s with parti- cular reference to the -	99	•••	•••	•••		
Indus (Sind) - Specific discharge gauges at Bachalshah on the -	101	•••	•••	<b>424</b>		
Information regarding rainfall, run-off Formulas and rate of	2*	P.	•••	••• ,	•••	
silting of reservoirs required in connection with a scheme in Transval, South Africa.			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			

I & J	Pages of Annual Report (Technical) for the year						
	1944	1945	1946	1947	1948		
Irrigation - Controlled. in the Bombay (Deccan).		75.12,	- 122				
Island at Suleimanki.	99			•••	•••		
Island for the Lower Sind Barrage site C.	93	in and the second of the secon			. • • • • • • • • • • • • • • • • • • •		
Islands and attracting spurs - use of - for training a river.	97	•••	• • • • • • • • • • • • • • • • • • •				
Islands u/s of the Barrage at Kalabagh	98	***		•••	•••		
Islands-Experiments with artificial "Attracting" islands to train the Hooghly River at Titaghar Jute Mill (Bengal).			) 	83			
Islands - Experiments with artificial "Attracting" islands at Luni River Railway Bridge No. 3, of the Samdari Raniwara Branch of the Jodh jur Railway.		ETT DE	53				
Islands - Effect of central island on exclusion of sand from canals, at the proposed Lower Sing Barrage on the Indus at Kotri.			105				
Islands-Optimum shape of the nose of central Island at Kotri for the proposed Lower Sind Barrage on Indus.		20 20	110		- ;		
·· <b>J</b>		2					
Jamshed, ur Water Supply Scheme Remodeling of the Dlmna Nala overflow spillway	<b></b>			in in in in silver Difan <b>s</b> e	116		

J	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
"Jetting" below Canal Falls & Bridges.	25,30	100	•••	••• ••• ••		
"Jetting" prevented by Lowering pavement level at Railway Bridges.	25	•••	•••	•••	* *** * *** * ***	
Jodhpur Railway line-Training of Luni River to prevent it damaging the-	•••	36-42	•••	•••	•••	
Jodhpur Railway - How to con- trol Luni River where it is crossed by the Samdari - Raniwara Branch Line on -	3*		•••			
Jodhpur Railway-Steps necess- ary to protect main Line-from Hyderabad to Luni Junction on-from damage by Luni River floods.	3* 5					
Jodhpur State - Design of a stilling basin d/s of the over- flow section of the main Erinpura Damin-	2*		•••			
Jodhpur State—Construction of a 500 cusecs Standing Wave Flume in—	2*	•••	•••	•••		
Jodhpur State - Erinpura Irrigation and Hydro-electrical Project siphon spillways in -	<b>2*</b>	•••	•••		•••	
Jodhpur State - Runoff from Erinpura Reservoir.	68	•••	7.4	•••		
Jumna at New Delhi - Present and future water requirements and supplies in the-	91	!	138 :		1.24	

J & K	Fages of Annual Report (Technical) for the year						
<b>J.C.</b> II.	1914	1945	1946	1947	1948		
Jumna at New Delhi - Training of the, near Delhi Gate Pumping Station.	4, 8	•••	60		••		
Jumna River at Delhi Gate Pumping Station - Training of - with pitched embankment on the right bank.	•••	48-48	•••	••••			
Jumna River-Relation between floods in the monsoon and regeneration in the hot weather in the -	93	•••		•••	••• •••		
K							
Kalabagh Barrage - Islands u/s of the	<b>9</b> 8	•••	•••		••• ·		
Karchi water supply scheme - 40 cusecs Standing Wave Flume in the masonry conduit taking off from the Haleji Reservoir.	2 <b>*</b>	••••	•••	•••	•••		
Katjuri and Mahanadi at Cuttack (Orissa) - Distribut- ion of flood waters between -	•••	19	44	35			
Katjuri River - protection of the left bank of -at Khanna- gar upstream of the Railway Bridge-Orissa.	•••			43	•••		
Khairpur State (Sind) - Danger of waterlogging in the Eastern Nara tract in -	3*	•••	•••	•••	•••		
Khari River - Minimum water- way required for Jodhpur Railway Bridge on	2		. 37	•••	***.		

K	Page	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948		
Khari river at Rajpur, near Ahmedabad (Bombay) - How to prevent outflanking of Barrage on -	2*	···	•••	•••	•••		
Khipro Canal (Sind) - Remodeling the, for sand exclusion.		•••	127	•••	**************************************		
Knuckle at Dunbar Cotton Mills - Longitudinal and cross row of piles at the -to enable accretion and silting to take place.	7,8		•••	•••			
Koilsagar Dam Project, Hyderabad (Deccan) - Siphon Spillway proposed for the			•••	•••	11(		
Kosai River.	13		•••	•••	• • •		
Kosi River - Factors affecting rapid westerly movement of -	•••	•••	132	•••	•		
Kotri Barrage - proposed design of, for effective sand exclusion from canals - Sind.	•••	•••	• • • •	116	·•.		
Kotri Barrage - Regulation of - "Still pond" or "Semi open flow" - and consequent height pocket gates at		***		134			
Kshipra River at Ujjain - Eros- ion of - control of	2*,5	•••		47	•••		
Kshipra River at Ujjain - Union of Madhya Bharat (Gwalior State) Training of the		•••			31		
Kuakhai River at the proposed Road Bridge site near Bali- anta (Orissa) - Training of the	•••	to done	6 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		4:		

K	Pages of Annual Roport (Technical) for the year					
	1944	1945	194"	1947	1948	
Kuakhai River-protecting the right bank of, above the B. N. Railway Bridge near Cuttack	•••	*	` <b> 6</b>	39		
(Orissa).  Kuakhai River – design of guide bank, above the B. N. Rail-			•	41		
way Bridge at Cuttack.  Land Drainage - In the Bombay Deccan.		•	121			
Leakage through Solani embankment.	63	•••	•••	•••		
Lloyd Barrage - Soil survey of area commanded by	***	•••	123	••••		
Lloyd Barrage - Training of the Indus River above Sukkur Barrage to prevent slips of the right bank below the nose of the Approach Channel.	•••	•••	17			
Lloyd Barrage - Stabilty of the proposed truncated nose for a super-flood of 9,00.000 cusecs, in the 1/80 G. S. model.			22	•••		
Lloyd Barrage - Afflux due to the proposed extention of the outer bank of Approach Channel at	•••		25			
Lock Span - proposed design of -in Lower Sind Barrage at Kotri.		•••	•••	191	· · · · · · · · · · · · · · · · · · ·	

L	Pages of annual Report (Technical) for the year						
	1944	1945	1946	1947	1948		
Low level Weir downstream of Delhi Gate Pumping Station.—effect of constructing a—on the low water channel at the Pumping Station.	8,9			•••			
Lower Sind Barrage (2400ft upstream of site B near Hajipur) - Experiments in connection with dissipation of energy downstream of -	•••	10- 1	•••	•••			
Lower Sind Barrage - Comparison of sites for the-	<b>5</b> 5		•••	•••			
Lower Sind Barrage - Design of the - Experiments to test the design for scour and sand exclusion from canals - Sind.	••• 	48-59	98	•••	•		
Lower Sind Barrage - Experiments to determine a suitable profile of the - to cause minimum afflux with gates fully open.	•••	22-29		•••			
Lower Sind Barrage, site C-	98		•••	•••	÷		
Lower Sind Barrage at Kotri- Factors affecting the exclusion of sand from the canals, at the proposed-	<b></b>		105	•			
Lower Sind Barrage at Kotri – Scale ratios of the model.	•••		107	•			
Lower Sind Barrage at Kotri - design of Lock Span.	•••	•	• 4.•	191			
Lowest bed levels in the Bukkur-Rohri gorge at Landsdowne Bridge during 19281944,	103	•••		• • • •			

L & M	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Luni River - How to control -where it is crossed by the	3*	•••	53,52	•••	•••	
Samadari - Raniwara Branch line on Jodhpur Railway.						
Luni River Floods - Steps necessary to protect main line	3,5		3 .	•••	***	
from Hyderabad to Luni Junction on Jodhpur Railway from—		•		i		
Luni Rivier - Training of the -to prevent it damaging Jodhpur Railway line.		35-12		•••	••	
M						
Mahanadi and Katjuriat Cuttack (Orissa) - Distribu- tion of flood waters between-		19-22	•••	•••	•••	
Mahanadi River - preventing scour below the central sluices of -at the Mahanadi Anicut at Cuttack (Orissa).	•••		5,27	31	•••	
Mahanadi River-Test of mea- sures to dissipate energy to		•••	31	•••		
prevent serious damage to the central sluices of -at Cuttack (Orissa).					[	
Mahanadi River - Calculations for the Standing Wave, Baffle pavement, etcproposed desi-		•••	36	•••	· · · · · · · · · · · · · · · · · ·	
gn to prevent damage to the central sluices of -at Cuttack (Orissa).						
Mahanadi River-Redistribution of sand load between the Mahanadi & Katjuri river system at Cuttack (Orissa),	•••		41	35		

М	Pages of Annual Report (Technical) for the year						
	1944	1945	1946	1947	1948		
Mahanadi River - Experiments with reduced and unreduced Naraj weir length to find the distribution of sand load bet- ween Mahanadi and Katjuri System.		•••	45				
Mahanadi Main canal Falls (C. P.) - coefficient of discharge of Notch type and Weir type Falls on	•••	•••	•••	2.3	•••		
Malaprabha river - Training the -to protect the left bank and abutment of the M&S.M. Ry. Bridge No, 8 at Hole-Alur on the Hotgi-Gadag line.		7,8	5		•••		
Manas, Beki and Balkadoba rivers (Assam) - How to train and control -	3,69, 70	•••	•••	•	4 64,		
Mandeswari River.	13	•••		•••	•••		
Maps-Rain Gauge Station maps of India, Burma and Ceylon.		••	162	•••	•••		
Maximum depth of scour at heads of guide banks and groynes, pier noses and d/s of Bridges.	74	•••		•••	•••		
Maximum depth of scour at noses of guide banks, groynes and at sharp bends.	75,83	•••					
Maximum depth of scour related to 2/d which is related to turbulence.	74	•••	. •		•••		
Maximum depth of scour round piers of Bridges in -							

M	Pages of Annual Report (Technica for the year					
	1544	1945	1946	1947	1918	
(a) the Brahmaputra at Amingaon;	75,82					
(b) the Ganges near the Hardinge Bridge (B.A. Rly.);	75,82		•••	•••	1.	
(c) the Karnaphuli Railway Bridge.	75,78, 82	•••	•••	<b></b>	•••	
(d) the Ravi near Rly. Bridge at Dera Baba Nanak (N. W. Rly.);	75,77, 82	•••	•••	•••	1.	
Maximum depth of scour at noses of guide banks, groynes and at sharp bends in—			- ?			
(a) Ganga at Sara Guide bank, 3 miles u/s of the Hardinge Bridge;	79,83	•		•••	•••	
(b) Ganga near the nose of the Right Guide Bank of the Hardinge Bridge;	<b>75,8</b> 3	****	•••	•••		
(c) Narbada River. old Railway Bridge at Broach. B. B. & C. I. Rly.;	75,77 79,83	•••	•••	•••	***	
(d) Right Bank approach channel at Sukkur;	75,77, 83	•••		•	•••	
<pre>(e) Ravi u/s of Balloki Weir- (i) at nose of spur 5     on the Right Bank; (ii) at nose of spur 6     on the Right Bank,</pre>	76.77, 79,80, 83	•••	•••	. ••;		
(i) Sutlej at u/s of the Rly. Bridge, Ferozepore (N. W. Rly.) (i) at nose of spur 4; ii) at nose of the old Right Guide Bank;	76,77, 79,83		•••	•••		

M	Pages of Annual Report (Technical) for the year						
	1944	1945	1946	1947	1948		
Taximum depth scour d/s of bridges in -	*,8						
(a) the Ganga d/s of pier 3 of the Hardinge Bridge;	76,77, 83			•			
(b) the Rohri Canal d/s of Rohri Multan Road Bridge at R. D. 52,000;	76,77, 81,83		•••	•			
(c) the Rohri Canal d's of the Head Regulator at Sukkur;	76,77, 80,83		•		· · · · · · · · · · · · · · · · · · ·		
(d) scour d/s of the Road Bridges on the Eastern Jumna Canal.	76,7 <b>7,</b> 83	•••	•	• • • • •			
Maximum depth of scour d/s of Bridges.	75,76, 77,80, 81,83	• • • • • • • • • • • • • • • • • • •	•••				
Taximum freshet ebb discharge in the Rupnarian River at Kolaghat Railway Bridge on the B. N. Rly. in 1944 estimation of	14	•••	•••				
Meander length of the Rup- narain River - Increase in the-due to increase in fre- shet discharge.	14	•••	-	•••			
Meander Belt-probable maximum development to be allowed for, to prevent erosion of Railway embarkment at the proposed C. K. Railway Bridge over Ramganga River.	•••	•••	6	•••			
deandering of Rivers factors determining the size and shape of	<b></b>	•••	131				

M	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Measures to prevent bankerosion at the Rupnarain Bridge near Kolaghat on the B. N. Railway in Bengal.	3,13	•••	•••	•••		
Measures taken to control erosion of the left bank of the Rupnarain upstream of the Bengal Nagpur Railway Bridge at Kolaghat by means deflecting groyne.	•••	5-7	•••	•••		
Meshwa Canal Project (Bombay).	•••	•••	•••	•••	:143	
Methods followed in fixing model scale ratios and overcoming model limitations, based on experienced gained at the Indian Waterways Experiment Station, Poona.	•••	88-116	000	***		
Method of calculating scale ratios in vertically exaggerated mobile river models.	•••	107	•••	•••	•••	
Military Board set up in 1850 to study Damodar River flood and realingment of em- bankments.	14		•••	•••	•••	
Mississippi formula—use of— for estimating the maximum flood discharge in the Gandak River at Bagaha on the Oudh and Tirhut Rail- way in 1924.	12		•••	•••	•••	
Mithapur, Okhamandal-Kathia- wad-Silting of salt water intake channel at	• . •	•••	•••	•••	68	

M	Pages of Annual Report (Technical) for the year					
•	1944	1945	1946	1947	1948	
Mithrao and Khipro Canals - control of sand entering, Ex-Nara at Makhi (Sind).		<i>(</i>	127			
Mobile River models, vertically exaggerated – Method of calculating scale ratios in –	•••	107	•••		•••	
Model Experiments - Field results of measures adopted after.	···	•••	5	34	•••	
Model - Equivalent size and specific gravity of stones and blocks in a -	<b></b>	115 116	•••	•		
Model limitations - Methods followed in overcoming - and model scale ratios - methods followed in fixing - based on experience gained at the Indian Waterways Experiment Station, Poona.	•••	86 116		34	•••	
Model limitations - action of tree groyncs as regards bank erosion and accretion upstream and downstream of the groynes.	••·		5	***	•••	
Model-Pilot & mobile bed -Experiments with	15	•••	<b>* ◆</b> •	•••	•••	
Model scale ratios - methods followed in fixing - and model limitations - methods followed in overcoming - based on experience gained at the Indian Waterways Experiment Station, Poona.	•••	<b>8</b> 8 <b>116</b>	•••		****	

M	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Model-Scale Ratios of the Sutlej River model at Samasata Station-N. W. Railwoy.			76		•••	
Model - Scale Ratios of the Lower Sind Barrage model on Indus River at Kotri		. <b></b>	107	•••		
Model Scale ratios - Time scale. based on tractive force for- mula used in Kotri Island nose experiments-Lower Sind Barrage.	. <b>.</b>		110		-••	
Model (1/400, 1/66), vertically- exaggeratedof the Mahanadi and its Branches at Cuttack (Orissa) - Experiments with the	•••	1 -22	44	35	•••	
Model Scale ratios of model of 'Kshipra River at Ujjain.	* **	·		47		
Model scale ratios of Tapti River at Surat-design of				58	•••	
Model scale ratios of Cochin Harbour - design of	**1			103		
Models, geometrically - similar which give geometrically - similar results.		92		•• •		
Models, geometrically - similar which do not give geometrically - similar results.		99-101		•••	•••	
Models, rigid and vertically - exaggerated.		103	•••		•••	
Models, semi-rigid and vertically exaggerated.	***	10			ļ ··	

M & N	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Model Experiments - Technique of	••		143	•••	•••	
Models, tidal - scale ratios of -		104-105	•••	· · · · · · · · · · · · · · · · · · ·	•••	
Models, vertically - exaggerated of rivers (tidal and non-tidal).	••	102	•••		•••	
Models vertically - exaggerated and mobile - Methods of calcu- lating scale ratios in -	•••	107-	•••	•••		
Moja - Damodar river.	31		•••	•••	•	
Mokameh - Best alignment for submarine cables across the Ganga at Patna and	•••	•••	••• . ••	•••	148	
Motaguri Bund on the Manas River-Reaching the-	5	*** ***	- <b></b> -	•••	••	
Mud Banks-Report of the Special Committee 1938, on formation of Mud Bank at Cochin Harbour.		67.	•••	92		
Mud Banks-at Cochin Harbour - movement of -	Charles of the second of the s	•••		112	•••	
N					* * * * * * * * * * * * * * * * * * *	
Narbada at Borbhata down- stream of Railway Bridge near BroachPrevention of erosion in the		•••	•	•••	51	
Narbada River - Water levels of maximum floods in the - during 1886 to 1944.	£5	. •••	•••			
Narbada, Tapti and Sabarmati Rivers-Prevention of erosion of agricultural lands along the-	<b>2,3,</b> 5, 85		•••		· · · · · · · · · · · · · · · · · · ·	

N	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Neamati in Assam - Prevention of erosion at -	3*	•••	•••	***		
Nira L.B. Canal Head Regula- tor-Coefficient of discharge of the-	·•·	95	122	•••	•••	
Nira Right Bank Canal Aqueduct No. 23 - Fluming of	•••	122	•••	•••	•••	
Nomograms for determining commonly required hydraulic elements and constants.		78-80		****		
NomogramsPunjab Irrigation- by Mr. E. S. Lindley.	6			•••	• • •	
North Western Canal-Sukkur Barrage on Indus River- Flattening the slope of		•••	85	•••	•••	
Number of dry days during which Tansa storage (Bombay.) was depleted—years 1896-1944.	73	•••	•••	•••	• ••	
Number of wet days before depletion started in Tansa (Bombay) - years 1896 to 1944.	73	····		<b>r••</b>	•••	
Nuna - Pothi rivers in Orissa - Flood protection measures for -	3*	•••	••••		•••	
N. W. Canal in Sind-Prevention of scour below a bridge on the-	3	•••	•••	•	<b></b>	
N. W. Railway Bridge over the N. W. canal near Ruk, Sind — Deep scour d/s of the — experiments carried out to evolve a suitable design of pavement and side expansion to induce accretion.	23				•••	

O	Pages of Annual Report (Technical) for the year						
	1944	1945	1946	1947	1948		
O							
Offtake - Design of - at the entrance to the right pocket from the approach channel at Sukkur.		96 .	•••	. •••	•••		
Orissa, experiments with a vertically exaggerated model (1/400, 1/66) of the Mahanadi and its branches at Cuttack.	•••	19-22	•••	•	• • • •		
Orissa, Cuttack - Katjuri and Mahanadi group of rivers near-Experiments with a model of the		14	44	35			
Orissa, Cuttack - Mahanadi and Katjuriat-Distribution of flood waters between -		19		•••			
Orissa, Cuttack - Naraj weirat - Standing wave and drowned condition of the - and their effect on the sand drawn by the Katjuri.		19	•••	•••			
Orissa-Flood protection measures for Nuna Pothi Rivers in-	3*	•••	•••	•••	1 N		
Orissa, Prevention of silt going into the Surada Reservoir at its Padma Intake in -	2*	•••	•••	•••	•••		
Oudh and Tirhut Railway-Gandak River at Bagaha on the-which has outflanked the bridge-how to divert the-to its original course through the oridge.	10	•••					

P	Pages of Annual Report (Tech					
	1944	1945	1946	1947	1948	
P						
Patna and Mokameh - Best alignment for Submarine Cables across the Ganga at	•••	•••	•••	•••	148	
Periyar River - Dominant dis- charge of	•••	•••	•••	105	•	
Permissibility or otherwise of reducing spillway capacity, Berar (Akola Municipality).	2*	•••	•••	•••	•••	
Piers-depth of foundation of -for the proposed C. K. Rail- way Bridge over Ramaganga River.		•••	14		•••	
Piers - maximum depth of scour at the nose of	•••	•••	140	•••	•••	
Piers - scour round the		•••	129	•••	••	
Piles - Longitudinal and cross row of - at the knuckle at Dunbar cotton Mills to enable accretion and silting to take place.	7		39	•••	**:	
Pilot Model and mobile bed model - Experiment with -	15	•••	•••	•••	•••	
Port of Rangoon Tidal Model.		107	•••	•••	•••	
Positioning of 'attracting' is- lands as related to meander length.	97	•••	•••		•••	
Prediction of the future move- ment of the Gandak River at Bagaha,	13	•••	-		•••	

P	Pages of Annual Report (Technical) for the year						
	1944	1945	1946	1947	1948		
Preliminary note on the design of scale ratios of the model of the Hooghly River from Bansbaria down to reefs i.e. 15 miles below Saugar			•••		63		
Preliminary note on the Purna River (Bombay).		•••	•••		49		
Present and future water requirments and supplies in the Jumna at Delhi.	91		138	•••	•••		
Prevention of collapse of Rohri Multan Road Bridge over Rohri Canal at R. D. 52,000 in Sind.	3*		•••	***	•••		
Prevention of damage to the Surat-Rander Road and the city wall of Surat d/s of the Hope Bridge from floods in the Tapati River in Guja- rat	3,6,87	•••	3				
Prevention of erosion in the Narbada at Borbhata down- stream of Railway Bridge near Broach.	•••	•••	•••		51		
Preventing serious damage to the central sluices of Maha- nadi Anicut at Cuttack (Orissa).			27	• • • · · ·	•••		
Prevention of erosion at Neamati in Assam.	3*	~•	•••	•••	•••		
Prevention of erosion of agricultural lands along the Tapti, Narbada and Sabarmatirivers.	3,5,84	•••	•••				

P	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Prevention of erosion of Bom- bay foreshore and reclama- tion of land bearing S. No.71, part of Juhu and Greek-land.	1*	•••	•••	•••		
Prevention of foreshore erosion at Vizagapattam.	3*		•••	•••		
Prevention of further erosion on the left bank of the Rupnarain river above Kolaghat Rail- way Bridge of the B. N. Rail- way.	13	•••	130	•••	•••	
Prevention further erosion of the bank of Sutlej River at Samasata Station, N W. Rly.		•••	68	•••	•••	
Prevention of erosion along the foreshore of the Hooghly River above Calcutta.		•••	130	•••		
Prevention of further erosion of the left bank of Watrak River upstream of Kaira Town (Bombay).		•••	64	•••	•••	
Prevention of scour below a bridge on the N. W. Canal in Sind.	3,23	•••	•••	•••	•	
Prevention scour in Garang river on Assam access Road.	3*	•••	•••	•••	•••	
Prevention of scour below the central sluices of the Johna Anicut on the Mahanadi at Cuttack (Orissa).		•••	5	•••	••	
Prevention of sea wall erosion at Bombay.	1*			•••		

P	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Prevention of silt going into the Surada Reservoir at its Padma Intake in Orissa.	2*	•••		•••	•••	
Prevention of slips of the right bank of Indus below the nose approach channel - upstream of Sukkur Barrage.	•••	<b></b>	17	•••	•••	
Proposal to construct a Barrage on Tank Zam in N. W. F. Province to split up water between several areas.	2*	<b></b>	•••	•••	•••	
Proposal to prevent a recurrance of damage resulting from breaches in the Damodar river, Bengal.	3*	<b></b>	•••	•••	•••	
Proposed bridge and reclama- tion between Ernakulam Thanthoni and Mulavukad islands (Cochin).	***	•••	•••	•••	66	
Proposed diversion of 40,000 cs. to relieve flooding at Gorakhpur on O. and T. Railway.	2*	•••	<b>∵••</b>	•••	•••	
Proportionality of discharge in S.W.F.s. and height of hump-Relation between.	43	•••	•••	*** A.'	•••	
Protection of Bridge over River and Canals.	•••	•••	128	•••	•••	
Protection of Railway Bridge piers on the Godavari River at Rajahmundry	••.	•••	•••	•••	52	
Protecting of the foreshore of the Anglo-India Jute Mill on the Hooghly (Bengal).			42	•••	•••	

P	Pages of Annual Report (Technical)  for the year					
	1944	1945	1946	1947	1948	
Protection of retaining walls from scour by means of repelling spurs (Baluchistan).	·	8	•••	•••	•••	
Protecting the toe of a retain- ing wall from scour, particu- larly on a curve, in south Quetta, Baluchistan,	1*	•••		•••	•••	
Protection to the piers of the Elgin Bridge over the Gogra River on O. & T. Railway.	1*	•••	••• ·		•••	
Protective measures below the new udersluices of Son at Dehri - Bihar officers' proposals tested in Model.	21		•••	•••	•••	
Protective measures - Dehri (Bihar) - Optimum design of control blocks and deflectors.	21	•••	•••	-44	•••	
Pump House-supply of sand free water to Jamshedpur Pump House.			••	187	•••	
Pump House at Jamshedpur - design of intake tower.			•••	188	•••	
Punjab Engineering Congress – Written discussion by Director on Paper No. 275 "Rivertraining and control by pitched 'attracting' island".	97	•••	•••	•••	***	
Punjab Irrigation Nomograms by Mr. E. S. Lindley.	6			•••	•*>	
Punjab practice of constructing Headworks.	98	•••	•••	•••	•••	

${f R}$	Pages of Annual Report (Technical) for the year					
•	1944	1945	1946	1947	1948	
R				4	1 2 2 1	
Radhanagari Hydro-Electric Works Kolhapur Investigations in connection	•••	• • •	•••	•••	93	
with					40.	
Kail-cum Road Bridge across the Yamuna below the pro- posed barrage at Purana Killa.	•••	•••	•••	•••	48	
Railway Bridges - on Madras Bombay line of M. & S. M. Railway, between Miles 82 & 113; protective measures for	·	•••	•••	52		
Rainfall and run-off in Indian catchments.	68		124, 131	19		
Rainfall and run-off from Karamnasa river at Silhat weir, U. P.	68	•••	3304 1531 - 2 - 2 - 3 1			
Rainfall and run-off - In the Upper Indus catchment - some features of precipitational variation in -		•••	7	•••		
Rain Guage Station Maps of India. Burma and Ceylon.	•••	162	•••	***	· • • • • • • • • • • • • • • • • • • •	
Rajahmundry - Protection of Railway Bridge piers on the Godavary River at	68	•••	••			
Ramganga River - probable maximum flood discharge of, at the C. K. Railway Bridge.	•••	•••	10	•••	•••	
Ramganga River — design of Guide Banks for maximum depth of scour at the proposed C. K. Railway Bridge.			13	•••		

R	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Ramganga River - Length of Guide Banks at the proposed C. K. Railway Bridge over			••• .	15	•••	
Ramganga River - maximum depth of scour and depth of foundation for the proposed C. K. Railway Bridge piers over		•••	•••	14	•••	
Rander Road - closing of spills on right bank u/s of Hope bridge near Surat led to heavy erosion of the—	83		•••		•••	
Rangoon Port Tidal Model.	•••	107	•••	••,	•••	
Rate of sand attrition in channels.	·		115	<b></b>	. •1.•	
Recommendations of the Solani dam section based on model experiments.	63	•••	•••	••-	,	
Recovery of head. modular limit and range in S. W. Flumes,	37	•••		•••	•••	
Regeneration in the Jumna river,	93	•••	•••		•••	
Regime—divergence from - in stable channels in alluvium.		•••	135	•••	•••	
Relation between bulk proportionality and height of hump.	43	•••	•••	•••		
Relation between floods in the Monsoon and regeneration in the Hot-weather in the Jumna River.	93		••			

${f R}$	Pages of Annual Report (Technical)  for the year					
	1944	1945	1946	1947	1948	
Relation between the mean rainfall at Wada and Bhivandi and Bombay water supply—1895 to 1944.	73	•••	•••	•••	•••	
Relation between proportionality of discharge in S. W. F. s and height of hump.	43	•••	•••	•••	*6*	
Relation between the size of air pipe, size of the discharge pipe & the drum with leakage from chamber.	67		•••	•••		
Remodelling of Canals.		•••	123	•••	***	
Remodelling of Son Anicut at Dehri.	20,58	•••		•••	•••	
Remodelling Railway Bridge over the N. W. Canal at R.D. 75,000 on the N. W. Railway.	3,23	•••	•••	•••	***	
Remodelling the Rice canal in Head portion.	3, 04	***	•••	•••		
Repelling groyne upstream of the Railway Bridge on the Rupnarian River at Kolaghat on B. N. Railway - comparison of results in the model and in the river.	13	<b></b>	***		<b></b>	
Retaining walls from scour – Protection of – by means of repelling spurs (Baluchistan).	•••	8	•••		<b>***</b>	
Revetment acts as 'attracting' groyne.	2,104	***	•••	•••		
Rice Canal in head portion - Remodelling the -	3,104	·•·	•••	•••	•••	

R	Pages of annual Report (Technical) for the year					
16	1944	1945	1946	1947	1948	
Right Bank approach channel at Sukkur - Datum area 1,000 ft. d/s of Sukkur Barrage before and after the was constructed.	102	•••	•••	***	•••	
Rivers and Canals - flow in		•••	85	•••	•••	
River model Experiments— difficulties experienced in— due to effects caused by verti- cal exaggeration.	<b></b>	110-	•••		••	
Rigid structures in wide channels—Scour downstream of—		67-71	•••	•••		
Rigid, vertically - exaggerated models.		103	•••	•••		
River floods - Sunspot intensity cycles as a medium of predicting the probable dates of occurrence of	•••	86-87	•••	•••	••	
River meandering—factors de- termining the size and shape of	,	•••	181	•••		
River Bunds in Sind—causes of breaches and steps required to minimise the danger of recurrence.		•••	133			
River Training and control by pitched islands.	97		•••	•••	<b></b>	
River Training— the use of 'attracting' spurs and islands for—	97	•••	•••	•••		
Road Culverts — design approaches & exits of	•••		37	•••		

R	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Rohri-Multan Road Bridge over Rohri Canal at R. D. 52,000 in Sind—Prevention of collap- se of	3*		•••	•••	•••	
Run-off from catchments in Ceylon — advice regarding probable maximum	2*	•••	•••	<b></b> ·	•••	
Run-off from Lalpuri Tank in Rajkot State.	68	•••	•••	•••	•••	
Run-off from Vaitarna Catch- ment at the proposed dam- site (Bombay)		. •••	••	•••	7	
Rupnarian Bridge near Kolaghat on the B. N. Rly. in Bengal – Measures to prevent bank erosion at	3,13		•••	78	•••	
Rupnarian River u/s of the Kolaghat bridge on the B. N. Rly.—Causes leading to erosion of the left bank of the—	14		<b></b>	•••		
Rupnarian River 11/8 of the Kolaghat bridge on the B N. Rly., - Fair weather and freshet spring tides in the in 1944 and in its mobile bed model	17,20		•••	•••	•••	
Rupnarian River u/s of the Kolahat bridge on the B. N, Rly, - Maximum freshet ebb discharge in the - in 1944, estimation of	14	• • • •				

R & S	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Rupnarian River u/s of the Kolaghat bridge on the-B. N. Rly,, - Meander length of the-Increase in the-due to increase in freshet discharge-	14	•••	•••	•••	•••	
Rupnarian River above Kolaghat Railway Bridge on the B. N. Railway - Prevention of further erosion on the left bank of the -	13	•••	130	•••	***	
Rupnarian River above Kolaghat Railway Bridge on the B N. Railway - Repelling grosne u/s of the Bridge-Comparison of results in the model and in the river	18	•••	•••	•••		
Rupnarian River above Kolaghat Railway Bridge on the B. N. RailwayTidal Range of the-	14			•••	•••	
Rupnarian u/s of the B, N. Rly.  Bridge at KolaghatMeasures taken to control erosion of the left bank of the-by means of a deflecting groyne	• • •	5-7		•••	å.	
Ryve's Run - off formula		•••		20	•••	
S					ŕ	
Sabarmati, Narbada and Tapti Rivers - Prevention of erosion of agricultural lands along the -	2,3,5, 84	•••	•••	•••	•••	
Sabarmati River-Water levels of maximum flood in the-during 1893 to 1944	86	**	•••	• • •	•••	

S	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Sagi River-Minimum water- ways required for-Jodhpur Railway Bridge	•••	•••	37			
Sakri River project (Bihar)		•••		199		
Samasata spur on Sutlej river on the N. W. Railway to prevent dangerous erosion	3*,5		•••	•••	•••	
Sand and silt on the bed of the Rupnarain River at Kolaghat Railway Bridge on the B. N. Railway	16		•••	•••	•••	
Sand-exclusion and scour from canals—Sind. Experiments to test the design for		48-59	•••	•••		
Sand-exclusion-at the nose of the outer Bank and at the raised still of approach channel with and without outer Bank extension	••• A	•••	•••	177	***	
Sand-exclusion of sand from the canals at the proposed Lower Sind Barrage on Indus at Kotri			105	116	•	
Sand-design of air sand-meter	;	•••	•••	32		
Sand-nechanical analysis of by Puri sand-meter and Air sand-meter	•••	•••	•••	26	•••	
Sand-wind Tunnel classifier for sand and silt		***		28		
Sand – Entering R. B. Canals at Sukkur -Control of, by means of approach changel	•••	•••	126	).	ørse.	

S	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Sand excluding heads for the M. E Canal and M. W. Canal on the Son at Dehri (Bihar)	. 58	•••	127	•••	•••	
Sand Load - Redistribution of - between Mahanadi River and Katjuri River System at Outtack (Orissa)		19	44	35		
Sand-Rate of attrition of, in rivers and canals		•••	115	•••	•••	
Sangli State - Desilting and dredging Tanks in -	2*		•••	•••	•••	
Saturation line - effect of constructing a trench on the	61	•••	•••	) 	•••	
Saturation line or hydraulic gradient—effect of variation u/s water levels of the Solani Khadir dam model on—	61	•••	•••	•••	•••	
Scale ratios - Methods of calcu- lating - in vertically - exagge- rated mobile river models		107- 110	•••	•••	**************************************	
Scale ratios of tidal model		104- 105	···	•••		
Scale ratios of the Sutlej River model - experiments with Sutlej River model at Samasata Station - N. W. Railway	<b></b>	•••	76	•••	•••	
Scale ratios of Lower Sind Barrage model on Indus river at Kotri		•••	107	•	•••	
Scour and accretion in models and rivers compared with special reference to islands u/s of the Barrage	99	•••		•••	•••	

S	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Scour and sand exclusion from canals, Sind-Experiments to test the design for-	•••	48-59	•••	***	••	
Scour below a bridge on the N.W. canal in Sind-Prevention of -	3,23	•••	•••	•••	•••	
Scour below the central sluices of the Jobra Anicut on Mahanadi at Cuttack (Orissa)		•••	5,27	34	•••	
Scour below weirs.	74	67	1:4	67	•••	
Scour - Depth of scour in river downstream, with Ganesh Iyer Volute Siphon Spillways	•••		91	1+5		
Scour downstream of rigid structures in wide channels		67-71	114	69	•••	
Scour around the nose of the right bank approach channel at Sukkur	74			•••	•••	
Scour at spurs in river models	74	•••	•••		•••	
Scour downstream of flumed fails	•••	97	•••	67	•••	
Scour d/s of the Sarda Barrage at Banbassa (U. P.) - Preven- tion of	•••	•••	24		•••	
Scour - hole - Reproduction of - in a model, downstream of Hardinge Bridge piers 2 and 3	74	•••	•••	•••	•••	
Scour-hole d/s of the Hardinge Bridge	74	•••	***			

S	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Scour-hole, 47 ft. deep, Just d/s of the Head Regulator of the Rohri Canal	74	•••	•••			
Scour - hole, 35 ft. deep, just d/s of the Road Bridge at R D. 52,000 of the Rohri Canal, which threatened to undermine the bridge	74	•••			•••	
Scour-hole, in the canal bed and belied banks d/s of the railway Bridgo on the Rice Canal at R. D. 74944	74	•••	•••	•••	•••	
Scour-hole d/s of the N.W. Rly. bridge at Ruk over the N.W. canal-conditions leading to-	23	•••	•••	•••	••	
Scour-hole-Approximate quantity of stone required for filling the-in the Approach Channel and constructing a pitched truncated nose at Sukkur Barrage	•••	•••	26	• 45		
Scour-holes of the present under-sluices of the Son at Dehri (Bihar)	20	•••	•••	•••	••	
Scour in Garang River on Assam Access Road - Preven- tion of	3*	•••	•••		••	
Scour-optimum shape of the island at the proposed lower Sind Barrage at Kotri to get minimum scour at the nose of the island	- <b></b>	•••	112	••-	•••	

<b>S</b>	Pages of Annual Report (Technology for the year					
	1944	1945	1946	1947	1948	
Scour below Kotri Barrage	÷	•••	•••	72	••••	
Scour round divide wall noses - Kotri		•••	•••	71		
Scour-Prevention of, d/s of sluices of the Son Anicut at Dehri	<b>2</b> 0	•••	•••	•••		
Scour round bridge piers	•••	•••	129	•••		
Scour-model limitation of tree groyne action in reproducing bank erosion and accretion	•••	•••	5	•••		
u/s and d's  Scour - maximum depth of, at heads of guide bank and groynes, pier noses and d/s of bridges	•••	•••	140	.70	•••	
Scour-maximum depth of, at the truncated nose, Indus River above Sukkur Barrage for designing the apron	•••	•••	24	•••	•••	
Scouring of channels-factors affecting	•••	•••	132	•••	•••	
Scouring of tail channel and regulation, at Sukkur	•••	. •••	•••	61		
Sea wall erosion at Bombay - Prevention of	1*	•••		•56	1	
Semi-rigid, vertically - exagge- rated models	•••	105		•••	**************************************	
Sewage - Poona Sewage disposal by irrigation of	•••	•••	123		iaie	
Shape of catchment - effect of - on the run - off	68			20.7		

S	Pages of Annual Report (Technical) for the year				
	1944	1945	1946	1947	1948
Silting and scouring of channels  -factors affecting the, Note for the Orissa flood Advisory  Committee on our present knowledge of the	•••	•••	132	•••	•••
Silting of salt water intake channel at Mithapur, Okhamandal – Kathiawad	•••	•••	•••	•••	68
Silt-Prevention of -going into the Surada Reservoir at its Padma Intake in Orissa	2*	•••	•••		•••
Sind-Analysis of Inundation canals in-and its comparison with the the date of perennial canals	29-32		•••	•••	•••
Sind-areas flooded as a result of breaches in embankments in-during the 1942 flood season	11		••	•••	• •
Sind - Design of lower Sind Barrage at Hajipur	55	•••	•••	•••	•••
Sind—Indus—Effect of constru- cting a barrage accross a river on bed levels and water levels u/s and d/s with particular reference to the	99	•••	•••	••• •••	•••
Sind—Prevention of collapse of Rohri—Multan Road Bridge over Rohri Canal of R. D. 52,000 in	3*	···	•••	***	•••
Sind—Remodelling Railway Bridge over the N. W. canal at R. D. 75,000 on the N. W. Rly.	3,23	•••		•••	•••

S	Pages of Annual Report (Technication for the year				
	1944	1945	1946	1947	1948
Sind-Remodelling the Rice Canal in head portion	3	•••	•••	•••	•••
Sind—specific dischare gauge at Bachalshah on the Indus in	101	. •••	•••	•••	•••
Siphon and gates for Bhandar- dara Waste Weir to raise the retention level	••	•••	•••	•••	95
Siphon spillways		97-98	141	•••	•••
Siphon spillways: Ganesh Iyer's volute siphon Factors affecting the coeffi- cient of discharge of	<b></b>	72-78	••• ĝ	•••	•••
Siphon Spillways—preventing scour below Ganesh Iyer Volute Siphon by mutual impact of jets	***	•••	91	165	•••
Siphon Spillway proposed for Koilsagar Dam Project Hyderabad (Deccan)	•••		•••	•••	110
Siphon Spillway in Jodhpur State—Erinpura Irrigation and Hydro-electrical Project	2*	•••	•••	•••	•••
Slope—design of canals—slopes in perennial and inundation canals in Sind.	<b></b>	• • • •	136	•••	••,•
Sloping groynes above the old Rly. bridge on the Narbada River at Broach	<b>£</b> 5	•••	•••	•••	***
Soil classification and demar- cation of block area in Bombay Deccan	<b></b>		121	•••	•••

<b>S</b>	Pages of Annual Report (Technical)  for the year				
	1944	1945	1946	1947	1948
Soil surveys in Sind		•••	123		••
Solani Dam—Recommendations of the—based on model experiments	63	•••	•••		•••
Solani Dam — staunching due to silting u/s of the—effect of	63	•••	e#?	· <b></b>	•••
Solani embankment—Leakage through	63	•••	•••	•••	•••
Solani Khadir and Balta Jheel reservoirs in the U. Pmodel experiments in connection with	59	•••	•••	•••	•••
Solani Khadir Dam model-effect of variation of u/s and d/s water levels of the—on hyd- raulic gradient or saturation line	61	•••	•••	***	•
Solani Khadir Dam Project— Special features of	60	•••	•••	•••	***
Solani soil—Transmission coefficient of the	63	•••	•••	•••	•••
Son Anicut (Bihar)—sand reducing heads for the M. E. and M. W. Canals u/s of—	58	•••	•••	•••	•••
Son at Dehri (Bihar)—Optimum design of control blocks and deflectors.	21	•••	•••	•••	***
Son at Dehri (Bihar)—Protective measures below the new undersluices	20,23	•••		•••	•••
Son at Dehri (Bihar)—Remode- lling the anicut	•••	•••	127		

S	Pages of Annual Report (Technical) for the year				
	1944	1945	1946	1947	1948
Son at Dehri (Bihar) Scour-hole downstream of the present undersluices of—	20	•••	•••		
Son at Dehri—Protective measures below the new undersluices of—Bihar Officers' proposals tested in Model	21	•••	***	••••••••••••••••••••••••••••••••••••••	
Special features of the Solani Khadir dam project	60	•••	•••	•••	•••
Specific discharge gauges at Bachalshah on the Indus, Sind	101	•••	. • • • • • • • • • • • • • • • • • • •		i foliace
Specific gravity and equiva- lent size of stones and blocks in a model	•••	115- 116	•••		in Marcon
Spillways - Siphon		•••	141	•••	
Spur 6 at Tajewala Headworks acts as an 'attracting' spur	97	• • •	•••	•••	•••
Spurs - attracting and repelling	97	•••		•••	•••
Spurs - the use of 'attracting' - for training a river, u/s of a masonry work -	97	•••	•••	•••	••• ••• • • •
Standing Wave Flumes - Coefficient of discharge of	34	92-93	•••	•••	•••
Standing wave Flume - Controlled Irrigation		•••	122	•••	•••
Standing Wave Flume-design of-for the Jawai River Project (Jodhpur)	•••	•••	- 86	•••	
Standing Wave Flume - Water surface profiles in a 5' wide S. W. F. with parallel sides at various stages			86	***	

S	Pages of Annual Report (Technical) for the year					
~	1944	1945	1946	1947	1948	
Standing Wave Flume discharge coefficient - Effect of piers on, in Sind falls	••	91	•••	•••	•••	
Standing Wave Flumes - Effect of friction on coefficient of discharge	47	. ***	•••	•••	•••	
Standing Wave Flumes - Effect of piers on coefficient of discharge of -	48	•••	•••	• • • •	•••	
Standing Wave Flumes - Para- llel flow through the throat of -	31	•••	•••	•••		
Standing Wave Flumes-Recovery of head, modular limit, and range in-	37	•••	•••	•••		
Standing Wave Flumes - Standard designs of -	49	•••	•••	•••	••	
Standing Wave Flumes-Trapezoidal	34	•••	•••	700	•••	
Standing Wave Flumes and Flume Meter Baffle Falls – design of –	29	•••	•••	•••	- ***	
Standing Wave Flumes and Falls-discharge Table of	33	P1 8	•••	***		
Standing Wave Flumes and Falls. U/s gauge and gauge chambers – Position of –	32		•••	•••		
Standing Wave Flumes and Falls - Velocity of approach - effect of -	33	•••	•••	•••	•••	
Standing Wave Flume-curva- ture of flow in the throat of a		80–85	***	•••		

S	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Staunching due to silting u/s of the Solani Dam - effect of -	63	•••	•••	•••	•••	
Statistical analysis of past and future supplies available in the Jumna at the Headworks	6,91	•••		•••	•••	
of the Eastern and Western Jnmna canals at Tajewala and at Delhi						
Stone wall built to protect a palace acts as 'attracting' groyne and holds the river permanently along the face	104	•••	•••		•••	
Submerged spurs to enable accretion and silting to take place in the scour-hole d/s of the knuckle at Dunbar	7	•••	•••	<b>Cao</b>	•••	
Cotton Mills						
Sukkur Barrage - Afflux due to proposed extension of the outer bank of Approach		•••	25	117	•••	
Channel upstream of Sukkur Barrage over Indus						
Sukkur Barrage - Causes of accretion of the river bed at - and how to reduce rate of rise Part II		59-66	137	•••	***	
Sukkur Barrage - Mid - season scouring operation of the right pocket at		•••	•••	61	• > >	
Sukri River - Minimum water- way required for - Jodhpur Railway Bridge over			37	•••	•••	

S&T	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Sunspot intensity cycles as a medium of predicting the probable dates of occurrence of river floods		86-87	•••	•••	•••	
Surat-Rander Road and the City wall of Surat d/s of the Hope Bridge at Surat- Damage in 1944 to - and recommendations to ameliora- te present conditions	37	•••	•••	•••	•••	
Surging over baffle wall	30	***	•••	•••	-•-	
Sutlej River at Samasata d/s of the Empress Bridge at Adam- wahan N.W. Rly., Training of		•••	68	•••	•••	
Sutlej River-Training of the river with permeable tree groynes		•••	78		•••	
Table 1						
Tajewala – Headworks of Eastern and Western Jumna canals at –	13		•••	•••	•••	
Tansa automatic gates, Bombay- Torque required to move the		•••	•••	•••	107	
Tansa Dam - Determination of the coefficient of discharge of the automatic gates spillway		29-36	•••	153	•••	
Tapti, Narbada and Sabarmati Rivers-Prevention of erosion of agricultural lands along the-	3,5,84		•••	F4	•••	

Т	Pages of Annual Report (Technology for the year			hnical)	
	1944	1945	1946	1947	1948
Tapti River - Water levels maximum floods in the- during 1872 to 1944	84		•••		
Technical analysis of available data regarding the rise of water levels of the Indus in the past and to be anticipated in future —	99	•••	•••	•••	•••
Tidal Model of the Hooghly Estuary	•••	•••	•••	 	58
Tidal models - scale ratios of -	••	104-107	•••	••#	•••
Tidal range of the Rupnarian River at Kolaghat Railway Bridge on the B. N. Railway	•14	•••	•••	•••	•••
Tide generating apparatus in the Hooghly Model	•••	•••	•••	•••	73
Tons and Giri catchments— effect of storages in—on supplies in the Jumna during flood season & regeneration in the fair season	94	•••		•••	•••
Tractive force formula-used in fixing time scale of Kotri island model-Lower Sind Barrage on Indus	•••	•••	110	•••	
Tortuosity - Arc to chord ratio of Sutlej river loop at Samasata Station, N. W. Railway	•••	•	69	•••	•••
Training of Ganga River at Garhmukteswar	•••		•••	•••	29

m.	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Training of Luni River to prevent it damaging Jodhpur Railway line	· · · ·	36-42		•••	•••	
Training of Jumna River at Delhi Gate Pumping Station with pitched embankment on the right bank	•••	43-48		•••	•••	
Training of the Kshipra River at Ujjain - Union of Madhya Bharat (Gwalior State)		•••		•••	31	
Training of the Kuakhai River at the proposed Road Bridge Site near Balianta (Orissa)	•••	,	•••	•••	43	
Training of the Tapti River at Surat	••• 1		•••	•••	37	
Training the Hooghly River at Dunbar Cotton Mill with a by-pass channel		11-18	•••	•••	• • •	
Training the Jumna at New Delhi Gate Pumping Station	3	•••		•••	•••	
Training the Khari River so as to prevent outflanking of the pick-up weir and Head Regulator of the Khari cut canal, and damage to Raipur village in Ahmedabad District	2*			,,,		
Training the Malaprabha River to protect the left bank & abutment of the M. & S. M. Rly. Bridge No. 8 at Hole-alur on the Hotgi-Gadag line		7-8	·••	· · · · · · · · · · · · · · · · · · ·		

T, U & V	Pages of Annual Report (Technical) for the year					
	1944	1945	1946	1947	1948	
Training the river Kshipra near Ujjain in Gwalior State	2,5	**************************************		•••		
Training works at Dingra ghat on the Mahananda river in Bengal	•••	2*	*** *** ***	**************************************	~	
Transmission Coefficient of sand sample from the bed of Damo- dar River at Sindri	•••	•••	94	•••		
Transmission coefficients of the Solani soil	63		•••	•••		
Tree-Groynes - semi permeable tree groynes, to reduce risk of attack on the goods yard, Kolaghat Station upstream of B. N. Railway Bridge - Rup- narain River	•••		78			
Tube well-yield from, in the Zhob valley, Baluchistan	•••	•••	97		•	
Tube wells - yield in relation to sub - soil	:	•••	94	•••	• • • • • • • • • • • • • • • • • • • •	
Turbulence - Reduction of, in the River Hooghly down- stream of the knuckle at the Titaghar Jute Mill (Bengal)	• • •	•••	38	83	1	
Types of models	•••	88			•••	
U						
Ujjain-Erosion of Kshipra River at-control of-	2*,5		•••	•••	in karal La Salata T	
V				: · · · · · · · · · · · · · · · · · · ·	e e	
Vaitarna Catchment at the pro- posed dam site (Bombay) - Estimation of run - off from	•••	•••			7 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	

V	Pages of Annual Report (Technical) for the year				
	1944	1945	1946	1947	1948
Vaitarna dam spillway (Bombay) - Experiments for dissipation of energy below the proposed		•••	•••	•••	104
Vanes-submerged, to exclude sand from canals at Lower Sind Barrage on the Indus at Kotri		•••	101		
Vertically - exaggerated models of rivers (tidal and non-tidal)	•••	102	•••	•••	
Vertically—exaggerated model (1/400, 1/66) of the Mahanadi and its branches at Cuttack (Orissa)—Experiments with the—	•••	19-22	•••	••	••
Vertically - exaggerated and semirigid model		105	***	•••	•••
Vertically - exaggerated and rigid models		103	`		
Vertical exaggeration - Difficul- ties experienced in river model experiements due to effects caused by -		110- 113	•••	•••	`
Vertically -exaggerated mobile river models - method of calculating scale ratios in		107- 110	•	•••	•••
VizgapatamPrevention of foreshore erosion at-	3*	•••	•	••-	•
Volute siphons based on results from scale modelsLimitation in predicting, discharging capacity and flow conditions in full scale	•••	•••	•••	•••	25

V & W	Pages of Annual Report (Technical) for the year				
	1944	1945	1946	1947	1948
Volute siphon, Ganesh Iyer's – factors affecting the coefficient of discharge of –		72-78	•••	•••	
Waste weir—Experiments with half size model of automatic gates on Tansa—	<b></b>	•••	•••	153	•••
Waste weir level of the tank at Kalyanipura Village (Ajmer)  —The proposed raising of the		•••	***	•••	113
Water levels of maximum floods in the Narbada river during 1886 to 1944	85	•••	•••		
Water levels of maximum floods in the Sabarmati river during 1893 to 1944	86	•••	•••	•••	••• • * * * * * * * * * * * * * * * * *
Water levels of maximum floods in the Tapti river during 1872 to 1944	84		•••	•••	
Water supply for proposed Steam Power Station of the South Gujrat Electric Grid near Surat (Bombay)	<b></b>	•••	·	•••	14
Water supply, possibilities of - to Cutch State from Indus River	•••	***	•••	219	•••
Water supply - Bombay city - augmentation of -	70			•••	•••
Water supply, Delhi-Jumna River training in connection with-	8,9	•••	•••·	•••	•
Waterwayminimum for bridge over Sagi, Khara and Sukri Rivers - Jodhpur Railway		***	37	•••	••• • • • • • • • • • • • • • • • • • •

W. Y & Z	Pages of Annual Report (Technical) for the year				
	1944	1945	1946	1947	1948
Watrak River - Training the, to protect Kaira town, Gujerat (Bombay Presidency)		•••	64		•••
Watrak River -Tree groynes to prevent further erosion of left bank at Kaira Town	•••		64		•••
Water requirments at Delhi	91		•••	•••	•••
Waterlogging—Dangers of -in the Eastern Nara tract in Khairpur State in Sind	2#	•••	•••	•••	•••
Waterway of bridges in Ceylon —advice regarding	2*	•••	••	***	•••
Wave recording apparatus	77	•••	• • •	•••	•••
Weeds—water weeds and their eradication from canals	•••		124	•••	•••
Weirs, high coefficient		99-101	141	***	•
Weir-High Coefficient weir profile (Hyderabad - Deccan)	•••		86	•••	
Weir—Scour below weirs	•••		8-4-1	6?	
Working range of baffles	41	•••	•••		•••
Y		-		-	
Yamuna below the proposed barrage at Purana Killa - Rail -cum - Road Bridge across the		•••	•••	•••	77
Yield during monsoon from Tansa catchment—years 1896 to 1944	73	•••	•••	•••	••.
Z					
Zam Tank in N. W. F. Province Proposal to construct a Barrage on - to split up water between several areas	2*	•••	•	•••	•••

No.	Serial No.	Publications & Authours	Year	Price
1.	IHR 1.38	Annual Report of work done during 1937—38	1939	R . 7—8—0
2.	IHR 1.39	& Annual Report of work done during 1938-39	1940	Rs. 7-8-0
		By C. C. Inglis, A. R. Thomas, Rao Sahib D. V. Joglekar and staff at Khadakwasla.	S. C. San	
3.	IHR 2	Note on "The theory, design and construc- tion of Gibb Models which, without mov- ing parts, give a constant discharge within working imits irrespective of variations in upstream and dawnstream water levels"	1941	Rs. 3-8-0
		By C. C. Inglis and Rao Sahib D. V. Joglekar	•	
<b>4</b> .	IHR 1.40	Annual Report of work done during 1939-40  By C. C. Inglis, A. R. Thomas, Rao Sahib D. V. Joglekar and staff at Khadakwasla	1941	Rs. 7—8—0

No.	Serial No.	Publications & Authours	Year	Price
5.	IHR 1.41	Annual Report (Technical) of work done during the year 1940-41 and index for 1937-41	1942	Rs. 7—8—0
		By C. C. Inglis, A. R. Thomas, Rao Sahib D. V. Joglekar and staff Khadakwasla.		
6.	IHR 1.42	Annual Report (Technical) of work done during the year 1941—42	1944	Rs. 7-8-0
		By C. C. Inglis, J. S. Reid, Rao Bahadur D. V. Joglekar and Staff at Khadakwasla.		
7.	IHR 1.43	Annual Report (Technical) of work done during the year 1942-43	1945	Rs. 7—8—0
,		By C. C. Inglis, J. S. Reid, Rao Bahadur D. V. Joglekar and Staff at Khadakwasla.		
8.	IHR 1.43	Annual Report (Technical) of work done during the year 1943.	1945	Rs. 7-8-0
		By C. C. Inglis, Rao Bahadur D. V. Joglekar and staff at Khadakwasla.		

No.	Serial No.	Publications & Authours	Year	Price
9.	IHR 1.44	Annual Report (Technical) of work done during the year 1944.	1945	Rs. 7—8—0
		By C. C. Inglis, Rao Bahadur D. V. Jogle- kar and Staff at Khadakwasla.		
10.	IWE 145	Annual Report (Technical) of work done during the year 1945.	1948	Rs. 25—0-0
		By Rao Bahadur D. V Joglekar and Staff at Khadakwasla.		
11.	IWE 1.46	Annual Report (Technical) of work done during the year 1946.	1947	Rs. 7—8-0
		By K. K. Framji, Rao Bahadur D. V. Jogle- kar and Staff at Khadakwasla.	:	
12.	IWE 1.47	Annual Report (Technical) of work done during the year 1947.	1948	Rs. 25—0—0
-		By K. K. Framji, Rao Bahadur D. V. Jogle- kar and Staff at Khadakwasla.		
13.	IWE 3-1	"The behaviour and control of Rivers and Canals" (with the aid of Models) (in two parts)	1949	Rs. 16—8—0
		By C. C. Inglis.		

## **ERRATA**

Page	No. Line No.	Incorrect	Correct
8	18	1486	1.486
10	9 1385	60  cusecs = 7460  m.g.p.d	$13850 \text{ cusecs} \equiv 7460 \text{ m,g,p,d}$
25	23	August	August 1948
29	23	upt	up-
29	24	experimen	experiment
29	30	Traiding	Training
33	17	$Q_{\text{max}} = 136$	$Q_{\text{max}} = 1.36$
<b>33</b>	24	R.L. 15675	R.L. 1567,5
<b>33</b>	29	photo 2227	photo 5227
36	14	But, is	But, it is
$\mathbf{A}5$		h o e	hole
$\mathbf{A}_{0}$	5 10	$\mathbf{r}^{\mathbf{\hat{s}}}$	$\mathtt{L_2}$
Aé	3 16	$\mathbf{L}_{\mathbf{\sigma}}^{\mathbf{g}}$	${f L}_2$
37	32	experiences	experienced
38	23	currcent	current
<b>3</b> 8	36	comprise	compromise
39	3	groyene	groyne
39	34	top of at	top at
41	Marginal note	photo 4249	photo 5249 & photo 5244
A7	7 28	abopted	${f a}{f dopted}$
50	11	090 ft.	0,90 ft
. 57	6	Erosion	17, Erosion,
58	7	Tidal Model	18. Tidal Model
	31	effecti s	effect is
64	Table 1, Col 4 Line 5	5,196	5.250
65	Table !. Sub-heading of Col. 24,	$Q_{Scale} = \frac{L}{d^{3/2}}$	$Q_{Scale} = L.d^{3/2}$
	Last line $V =$	= $1.20 (\phi - \phi)^{0.37}$ etc,	$V = 1.30 (\phi - \phi)^{0.27} L^{0.27}$ $M^{-0.27} h^{0.23}$
		=	=
	(.	$ \times 0.2094 \times 0.822)$	$( \times 0.2084 \div 0.822)$
69	Marginal Note	Fig 55	Fig 57
	of sub-para 3,3		
71	12	041	0.41
74	19	$\mathbf{Menthod}$	Method
78	Marginal note		photo 5409
	of sub-para 3,1		
78	Last marginal note of sub-para	photo 5400 3,3	Photo 5409

Page	No, Line No.	Incorrect	Correct
83	Last line	5500 ft. parallel with guide bank	5500 ft, parallel to and upstream of the barrage at for Q = 3,00,000 cs.,
			alternatively with guide
			bank
84	Table 1,	070 et seq	0,70 et seq
	Col 2	-	Decimal for whole columny
86	11	afflax	afflu <b>x</b>
88	16	R.L. 520	R.L, 52,0
88	Marginal note of sub-para 6,2.1	Fig 6	Fig 76
À	_*	R = ( )	$R_2 = ( )$
95	12	in 1941	in 1941 (see fig. 83).
97	5	par million	per million
98	4	Prtuberances	Protuberances
	Table 3, Col 7 & 8	2700 595	270,0 595
	Last 2 lines	27,00 6,33	270,0 63,3
122	9	tovery	to very
129	10	$q = C_d^{1} \gamma_{2g(D-d_1)}$	$q = C d_1 \gamma \overline{2g(D-d1)}$