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MAIN TECHNICAL AND ECONOMIC PROBLEMS FACED BY DEVELOPING COUNTRIES IN PRODUCING AND SELLING NATURAL RUBBER[1/]

by

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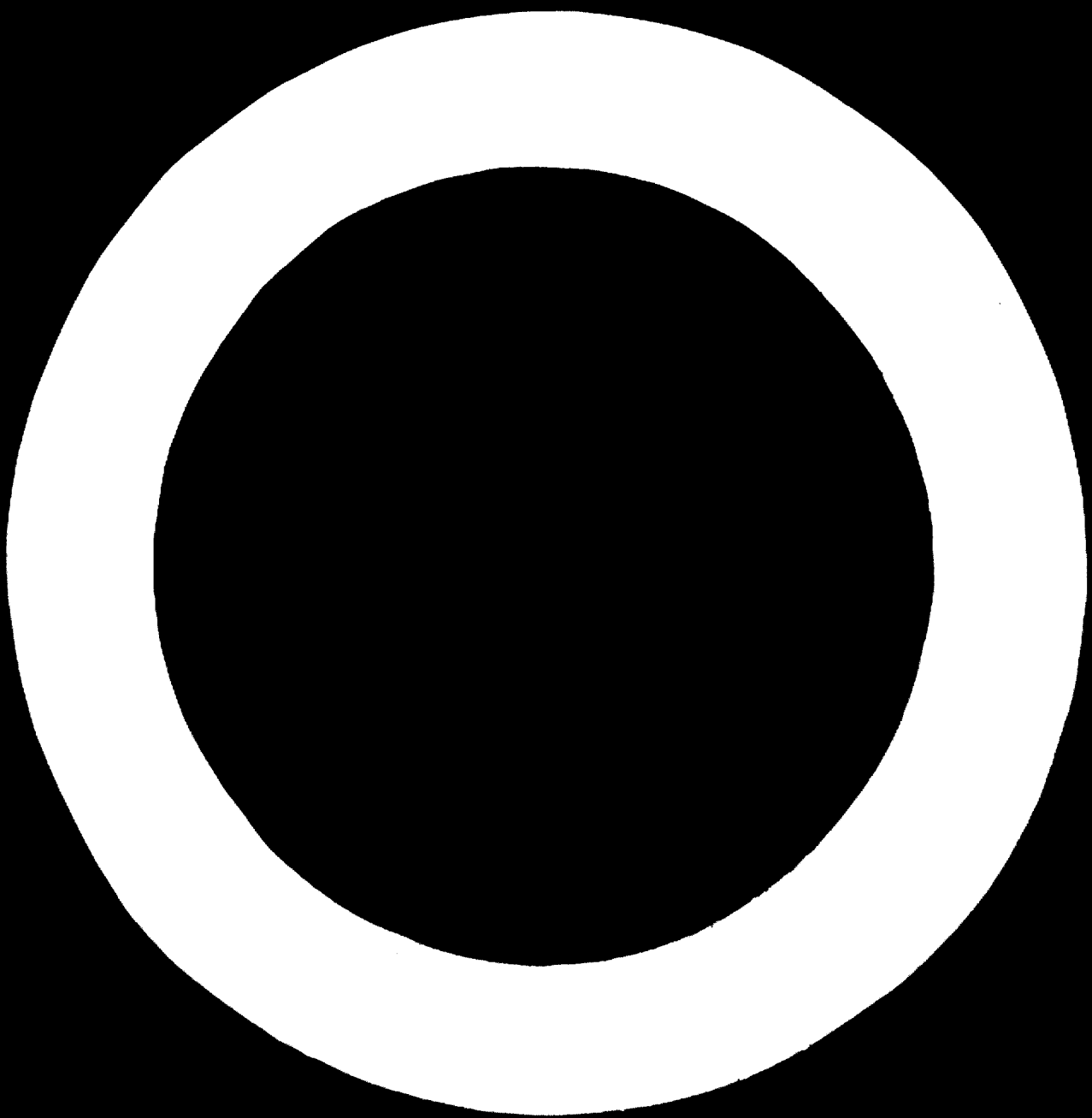

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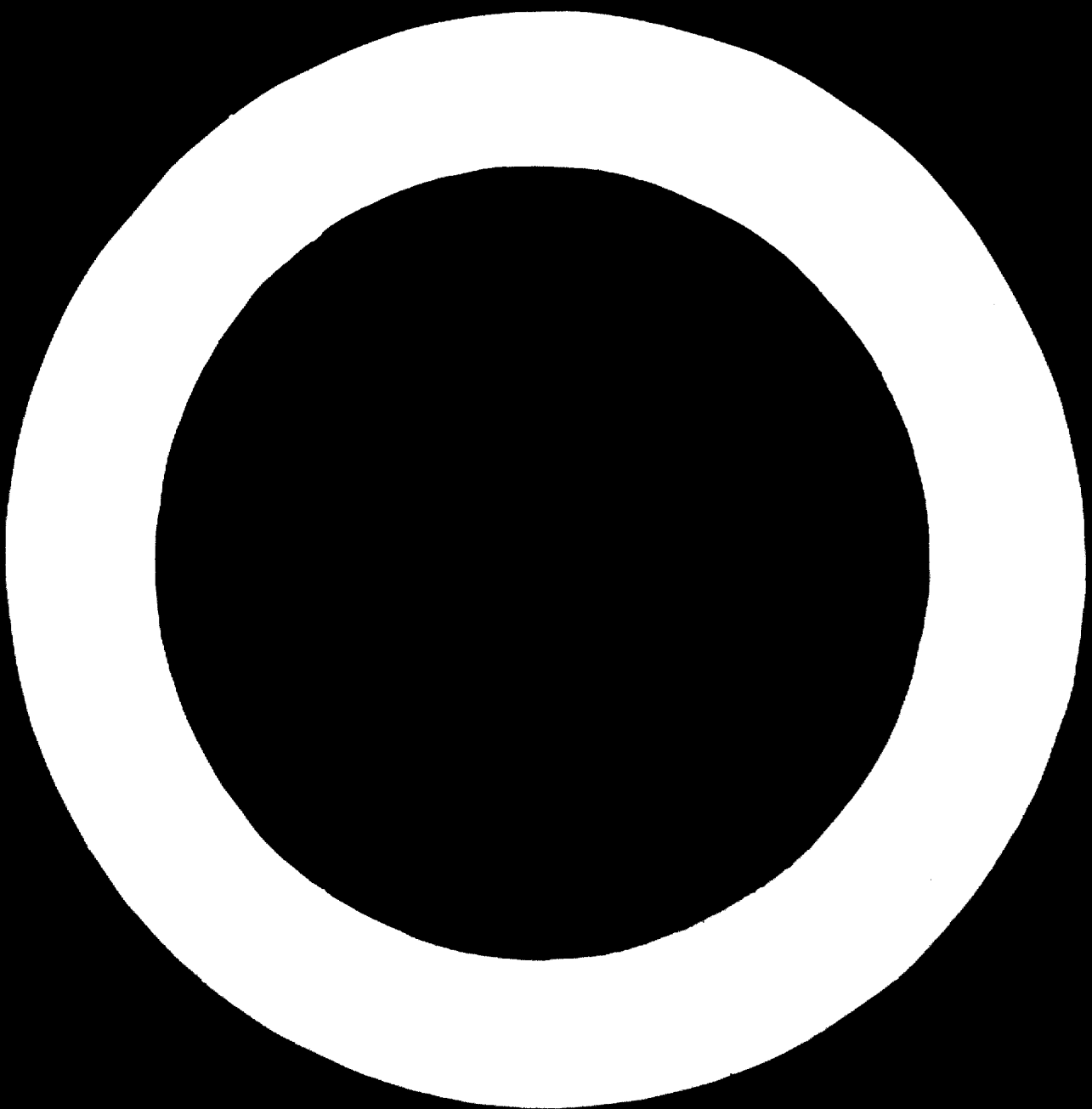


I. Introduction

1. Natural rubber accounts for something like a third of the world's production of all rubbers. Nearly 85% of the output comes from South East Asia, with Malaysia alone accounting for more than 40%. Technical and economic problems associated with the production and marketing of natural rubber vary somewhat among producing countries but there are some important common features, viz.

(a) Natural rubber is responsible for a substantial proportion of foreign exchange earnings and national revenue.

(b) The industry is a large source of employment.

(c) The industry is composed of plantations and smallholdings, with the latter predominating.

(d) The produce is sold through a commodity market, with producers having no direct control on price.

(e) Natural rubber is a perennial crop with an immaturity period of 5 to 6 years and an economic life span of over 30 years.

II. Impact of price decline

2. The problems of the NR industry stem basically from an intensification of competitive market forces that in the last two decades has brought about a marked decline in the NR price (Figure 1).

3. What does this price decline mean overall to the produoing countries? If total NR production had remained static from 1960 to 1970, this would have represented a loss in export income of some M$18,000 million; for Malaysia alone the loss would have been M$6,300 million. However, because of rising production and production efficiency, the actual losses amounted to M$12,000 million and M$3,200 million for all producing countries and for Malaysia, respectively. Figure 2 depicts Malaysian production during the period 1950 to 1970 in relation to export income.

4. The situation that confronts natural rubber producing countries, therefore, is one of a continual erosion of their efforts at increasing production and productivity. Unelightened opinion for this unhappy state of affairs sometimes ascribes the price decline to over-production of NR, but this is hardly consistent with the pattern of total consumption of rubber in relation to NR and SR production over the past 20 years (Figure 3).

5. Incontestably implicit in Figure 3 is that any attempts to restrict production of NR to maintain prices would most certainly have led to further encroachment of SR into the NR market. Indeed, the fact that total rubber oonsumption has been increasing at a considerably faster rate than NR production has inevitably led, for this reason alone, to displacement of NR from cases for whioh it remains fully satisfaotory on technical grounds. NR has retained certain important outlets where the preference for its superior properties has dictated its use, but there is a wide field of usage where SR, on grounds of price, availability, or sheer aggressive marketing, has been able to elbow its way in. The competitive forces thus called into play have led to serious market weakness for NR and SR which so far no one can apparently fathom how to sensibly restrain. The limit for the SR industry's solution to this widely admitted problem has been to build more plants, put more production on to a saturated market, let the price come down, and hope the other firm goes out of business first.

6. In these circumstances the NR industry is left with no alternative but to fight for survival, hoping that when everyone has hurt everyone else for long enough that true self-interest will prevail but in the meantime redoubling its efforts to:

(a) improve productivity per acre and increase production to ensure adequate supplies long-term;

(b) reduce overall costs and become viable even at economically unreasonably low prices;

(c) improve quality, presentation and grading.

In short, there must be modernisation of all aspects of the industry, backed up by research and development actively attuned to the rubber scene worldwide.

7. What are the achievements to date in this respect? A brief resumé, can appropriately be given in two sections, viz. (1) production and productivity improvements; and (2) presentation and quality improvements in relation to consumer requirements for raw rubber.

III. Production and productivity improvements

8. A long-term systematic tree breeding programme has brought about a remarkable uplift in yield levels as shown in Table 1. Theoretical considerations suggest a limiting yield of near 10,000 kg/ha/year, so further genetically-controlled increases can confidentially be looked for. Because of the nature of crop harvesting by tapping, higher production per tree brings about a substantial reduction in unit tapping cost and thus in unit production cost.

TABLE 1

Period	Type of planting material	Yield kg/ha/year
1920's	unselected	560
1930's	Pil B 84	975
1940's - 1950's	PB 86	1120
1950's	RRIM 501	1460
1960's	RRIM 600	2350
1970's */	RRIM 703	3360

*/ still under experimental trials

9. But to realise these benefits of tree improvement requires that the new yielding varieties be promptly and extensively planted, i.e. it is dependent on an effective replanting programme. Malaysia and other producing countries have undertaken to differing extents such programmes. The Malaysian position is expressed in Table II. Resource allocation for such a programme is, of course, enormous. In the last 20 years the monetary investment in replanting in West Malaysia amounts well over M$1,500 million.

TABLE II

Proportion of high yielding material and yield per hectare per year (West Malaysia)

Year	% high yielding material (replanted & new-planting)		Yield (kg/ha/year)	
	Estates	Smallholdings	Estates	Smallholdings
1950	10	1	570	465
1955	24	8	550	432
1960	48	29	758	437
1965	68	54	953	590
1970	89	63	1194	762

10. That there remains a wide gap between national average yield and that of the best proven planting materials is evident from a comparison of Table II with Table I. This yield gap arises from:

(a) Only a small percentage of the planted area can, for obvious commercial reasons, be replanted per year.

(b) A tree has an immaturity period of 5 to 6 years from planting to tapping.

(c) An economic tree life span of about 30 years.

(d) Hesitancy about planting the latest high yielding material until secondary characteristics, such a proneness to diseases or wind damage, are found favourable from longer experience.

11. Thus, there is necessarily a "time lag" between the first availablity of new planting material and its commercial exploitation. Two recent developments, now in limited scale operations, promise to reduce the "yield gap" or to shorten the "time lag". These are (1) the "three part tree", and (2) improved methods of yield stimul tion.

"Three part tree" - crown budding

12. To breed a tree combining a high yielding level with a number of required secondary characteristics, such as resistance to leaf diseases and wind damage, ability to withstand vigorous exploitation, and excellent bark renewal, is an exceedingly difficult and complex task, especially where one remembers the time-scale of rubber breeding (i.e. twenty years from pollination to trail-proven clone). The selectionist is virtually forced to strike a balance between potentially good and not such good tree properties of often with some uncertainty as to what these will actually turn out to be. But over the years, information has accumulated of certain known tree varieties which give very high yield, others which are especially disease-resistant and so on, and the step has been taken of 'artifically' combining these in one plant. The principle is very simple: a high yielding trunk is first grafted on to a vigorous root stock and then, a little later, a new "top" is grafted on the latter from a variety with high disease resistance and good growth habit - thus ending up with a "three-part-tree". The trick, of course, is to find out how to carry out this double grafting without appreciable plant losses and with minimum delay in time to maturity. The technique is now being practised on a commercial scale with success, and the advantage in respect of combining high yield with high wind resistance is shown in Table III.

TABLE III

EFFECT OF CROWN BUDDING ON UNACCEPTABLE RUBBER CULTIVARS

(Yield in Kg per hectare and % of wind damage within brackets)

Trunk	Crown	1st Year	2nd Year	3rd Year	4th Year	5th Year
	PRIM 613	1100 (10.7)	900 (40.0)	1000 (46.3)	870 (48.6)	830 (54.3)
PRIM 613	PRIM 612	870 (1.0)	1380 (1.9)	2?.0 (4.8)	2860 (4.8)	3100 (5.7)
	PR 107	910 (-)	1300 (1.3)	1880 (1.9)	2470 (3.2)	2510 (5.7)

Yield stimulation

13. Millions of relatively low yielding trees are in the ground which for one reason or another cannot be replanted in the near future - and yet the owners of these must be helped to remain competitive or they will simply "go to the wall". It is particularly in relation to this problem that recently developed concepts on exploitation with novel yield stimulants are so significant. The principle, when it has been discovered, is again very simple. Many tree varieties do not yield to

their inherent limit because coagulation occurs during latex flow, rather as blood clotting prevents blood loss. However, certain chemicals applied near the tapping cut act to retard this latex "clotting" so that the yield then obtained is increased. A potent chemical for doing this is known as Ethrel. Different tree varieties respond differently, but in many cases the proper application of Ethrel leads to a doubling of the ordinary yield and without adverse effects on the trees. Typical results on some popular clones and seedlings planted in Malaysia are given in Table IV.

TABLE IV

Type of Material	Yield (Kg/ha/year)	
	Unstimulated	Stimulated
Seedlings	1526	2339
Tj 1	1446	2131
PB 86	1436	2768
PRIM 600	2242	5439

14. This stimulation technique can be utilized to increase yield or to reduce the tapping intensity, thereby conserving bark or economising on labour input. Table V shows the effect of stimulation with a one-third spiral and a quarter spiral tapping cut in comparison with a half-spiral cut as normally used.

TABLE V

Tapping System			Yield (Kg/ha/year)		
			Tj 1	PB 86	PRIM 600
Unstimulated S/2 d/2			1446	1436	2242
S/2	d/2	stimulated	2131	2768	5439
S/3	d/2	stimulated	2415	2701	4637
S/4	d/2	stimulated	2207	2406	4271

15. Table VI gives typical results from reducing the frequency of tapping of trees under Ethrel stimulation. In the fourth daily or sixth daily system, the productivity of tapping labour is increased two-fold and three-fold respectively, over that of the common alternately daily system.

TABLE VI

Tapping System			Yield(Kg/ha/year)		
			Tj 1	PB 86	PRIM 600
Unstimulated S/2 d/2			1446	1436	2242
S/2	d/2	stimulated	2131	2768	5439
S/2	d/4	stimulated	1980	2132	3892
S/2	d/6	stimulated	1626	1771	2445

16. To sum up:

(a) The new yield stimulation method, applied properly and judiciously, can greatly raise yield capacity of mature trees already on the ground. The national average cost of production can thereby be substantially reduced irrespective of replanting.

(b) Tapping intensity can be greatly reduced thus greatly reducing unit costs since tapping is the major item on total production costs. Sociological factors will bear on how this lower tapping input can be exploited, but it is plain that if competitive forces so dictate, the industry has in its hands a potent method for cutting costs.

IV. Presentation and quality improvements

17. Modernisation has been no less evident in this part of the production scene. In 1965 Malaysia spear-headed the drive to revolutionise methods of processing, grading and presenting NR. The striking growth in output of Standard Malaysian Rubber (SMR), a development now mirrored in other producing countries, is shown in Table VII.

TABLE VII

Year	SMR Shipments (tons)
1965	439
1966	6,077
1967	19,275
1968	27,061
1969	135,843
1970	227,878
1971	319,200

18. The support facilities necessary to sustain such a radical innovation are themselves considerable viz:

(a) A control standards laboratory to approve test methods and to ensure inter-laboratory consistency.

(b) Routine testing laboratories for SMR shipments.

(c) A SMR inspectorate to check that the SMR guarantee is met on shipment.

(d) A school to train factory managers and laboratory supervisors.

(e) A field extension service to support the processing factory operations.

(f) Research and development on processing methods and machinery.

19. Progressive advances in the SMR scheme are steadily being made. Having established consistency within the new technical grades to certain basic standards, control on other criteria such as viscosity, breakdown and cure characteristics are being introduced. Further, more specific tailoring of NR for consumer requirements is being attempted. For example, a general purpose tyre grade rubber is in pilot-scale production. An important bi-product of this increasing technical sophistication is the direct technical dialogue that it prompts between producers and consumers, thus encouraging the clearly beneficial in-step approach to developmental ideas and their exploitation.

20. In short, technological innovation in the producing scene has demonstrated that:

(a) NR can be graded and presented to the standards of an industrial raw material.

(b) NR is capable of being "tailored" to satisfy changing requirements of consumers;

(c) The basically agricultural NR industry can effectively respond and adapt to the norms of modern industrial practice.

V. Problems before the NR industry

21. The fact that the NR industry has not only withstood the strong competitive pressures exerted by a powerful, oligarchic industry backed by all the resources of industrially-advanced countries but has embarked upon, and appreciably undergone, a radical face-changing modernisation speaks as nothing else can for its inherent soudness and strength. Were NR an over-run and dying industry, it would have been moribund by now- an adjectival description which ever the most critical would regard as ludicrous. But another fact is no less true and carries greater force than it ever did *vis*. that the future of the NR industry is tied to the "radical face-changing modernization" just referred to. The industry must not only "replant or die", it must on a much broader front "advance or die" - and a key problem is how to bring this about.

22. There are three essential needs:

(i) a research and development effort of strength to continue to push forward the technical frontiers so that cost and quality competitiveness can be maintained come what may;

(ii) the quick and ready utilisation and exploitation of the technical advances in production, processing and presentation in the producing countries;

(iii) adaptation of old-type marketing methods to the positive promotion and selling requirements of a modern, industrial product in a tough, competitive business.

23. To realise these needs poses a tremendous problem of resource alteration and input to the developing, producing countries, who are hard pressed to tackle the task even modestly. To help the NR industry and the producing countries means practical help of just this kind. Not words, exhortations, resolutions - just practical help.

24. On top of this problem is another and vexatious one. When a country which has expended very substantial monetary and other effort as Malaysia has, comes to find its achievement are undermined by might being-right competitive, trading, and shipping practices outside its control and originating in countries allegedly sympathetic to the developing world, than it can fairly complain that things are seriously wrong somewhere. It is to dampening down these practices, which are so clearly antagonistic to producing countries economic advancement, that international co-operation is called for if development effort and aid, in any positive value-for-money sense is to be meaningful.

25. In this general context, the relationship of the NR and SR industries is of particular importance. The NR industry over the years has come to live with SR - it has recognised the competitive pressures, some fair and legitimate, others by no means so, and accepted that production abilities in relation to demand has necessitated a shrinking share of the market.

26. But has the SR industry come to terms with the NR ? Does it still imagine that it can drive NR out of business without more or less crippling itself in the process? Has it settled for more production at any cost, however, low? How does it justify producing synthetic poyisoprene rubber when NR is in such ample and growing supply? Does not self-interest, and shareholders return, require a policy of non-destructive co-existence? There is much that could be done to cut out unprofitable in-fighting while maintaining healthy, competitive growth - and the NR industry would undoubtedly look favourably on playing its part in bringing some measure of order into a situation singularly disordered and depressive to producers at large.

FIGURE 1

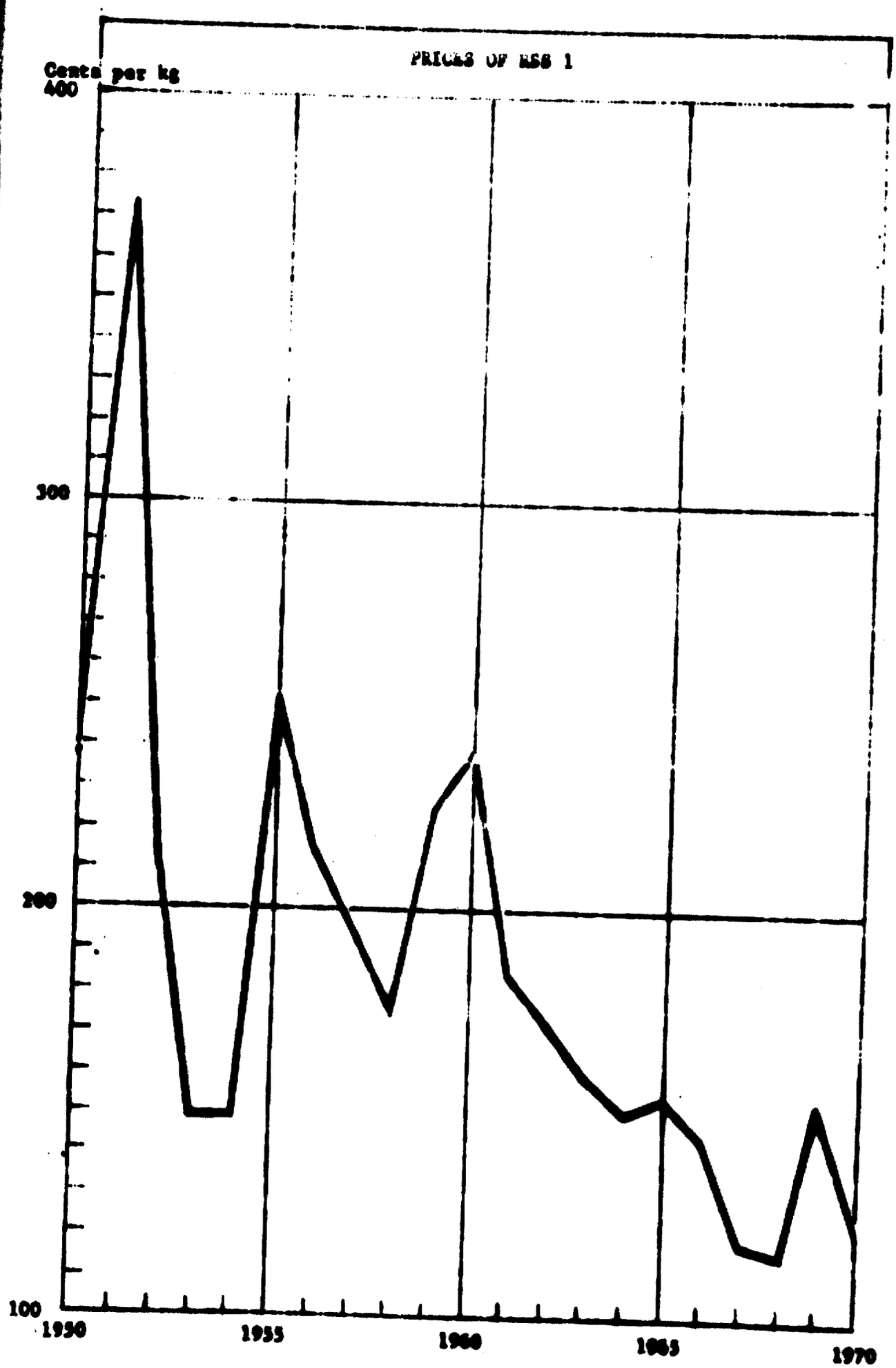

PRICES OF RSS 1
Cents per kg
400
300
200
100
1950
1955
1960
1965
1970

FIGURE 2

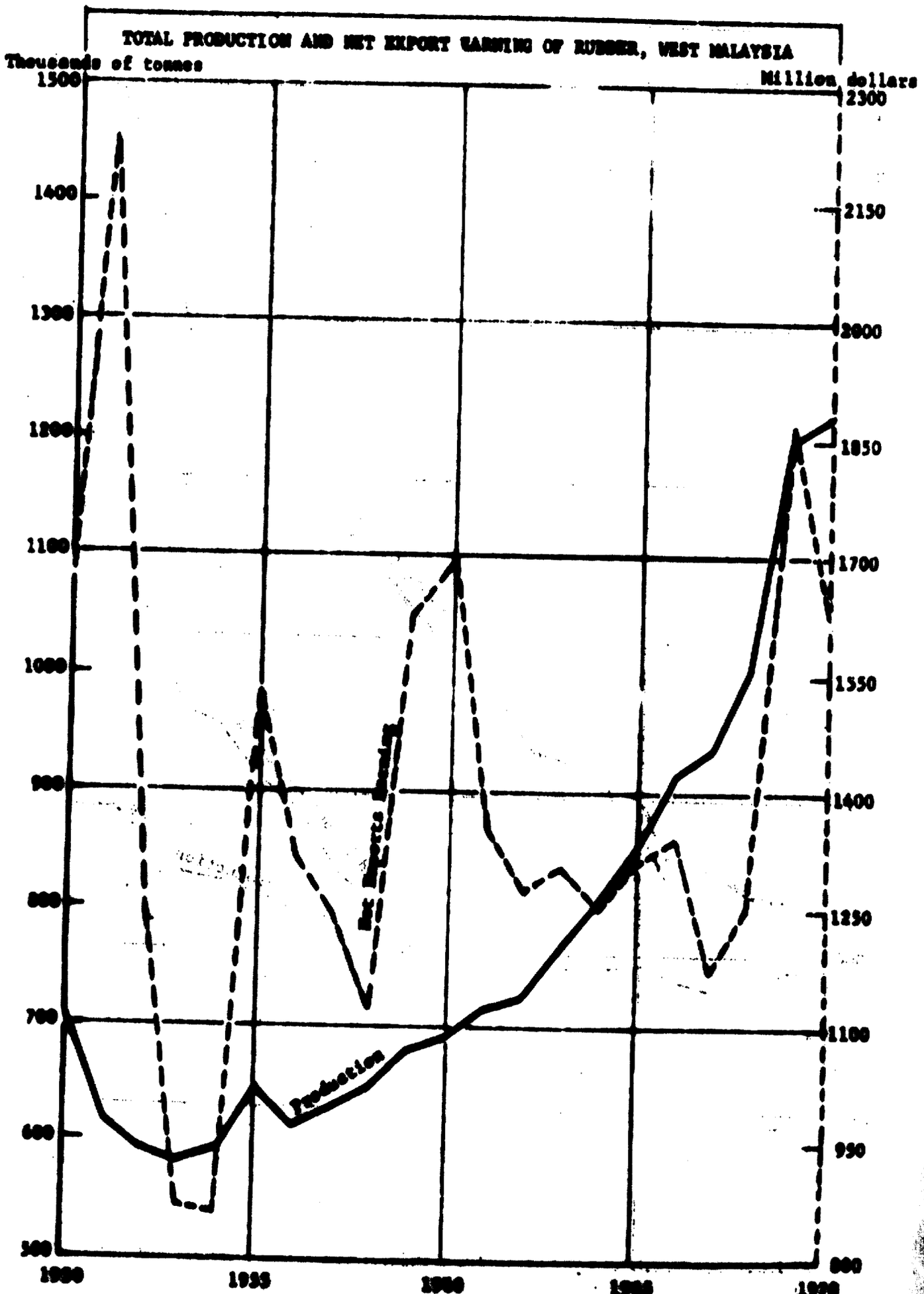
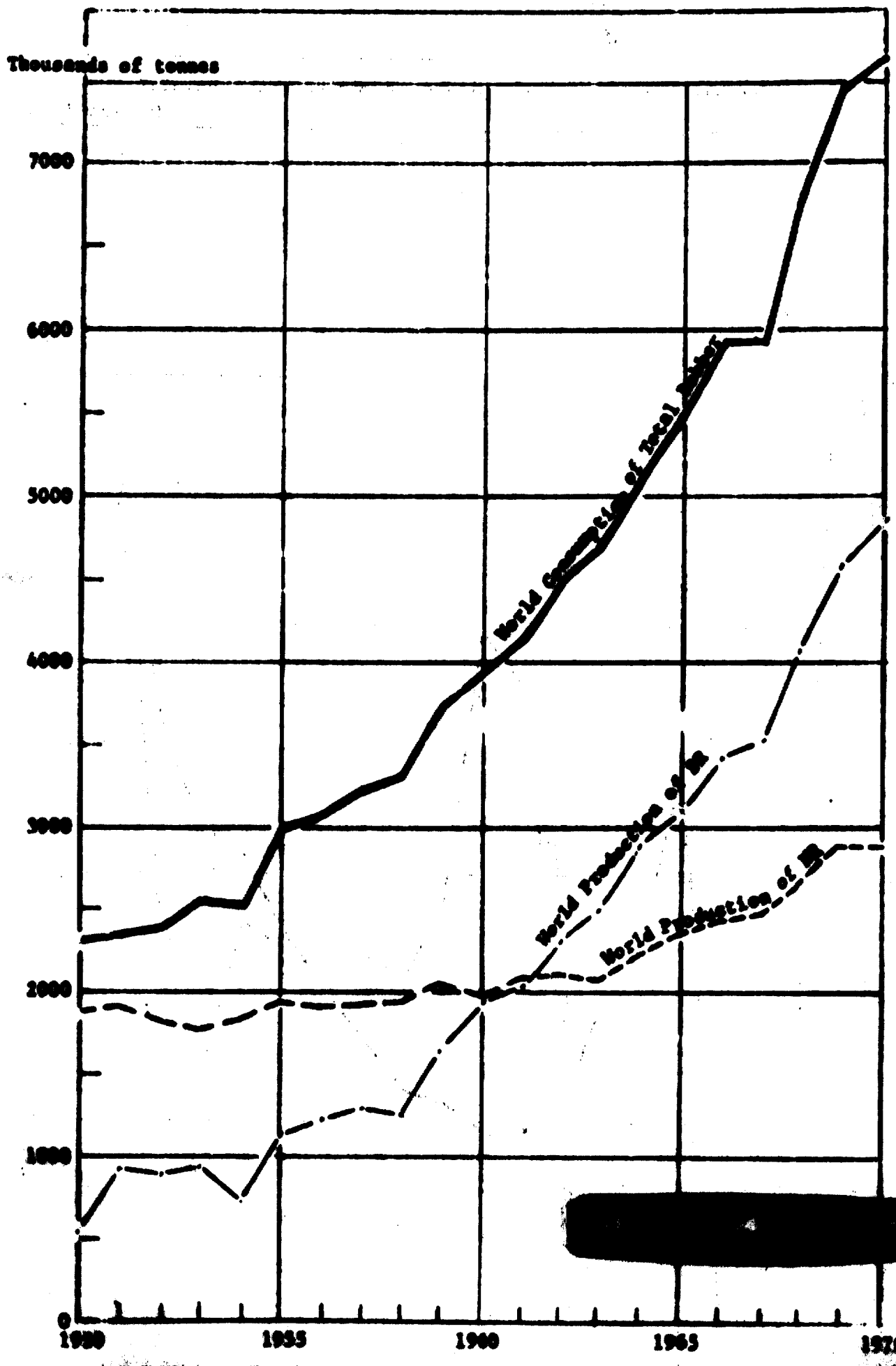
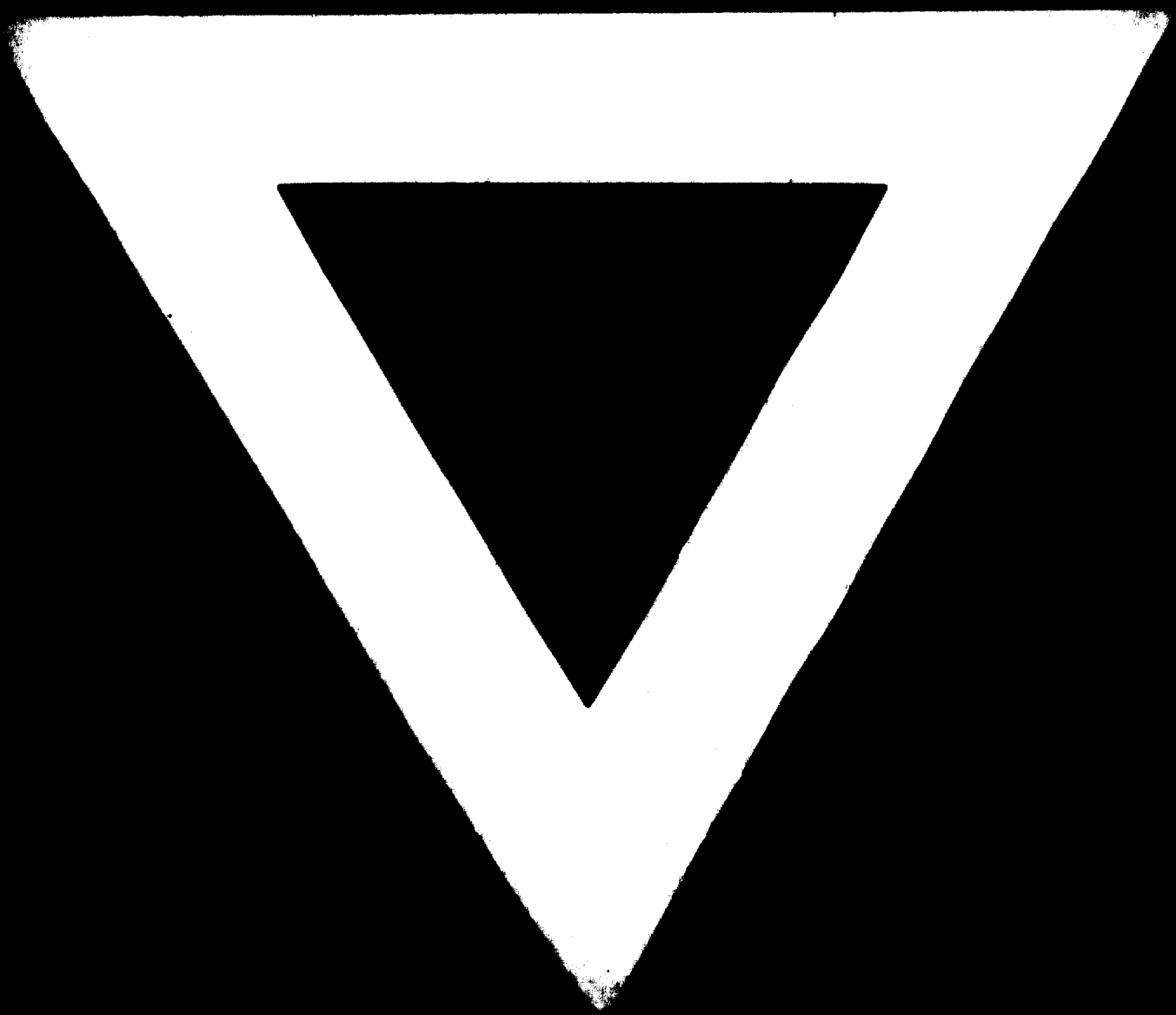

TOTAL PRODUCTION AND NET EXPORT EARNING OF RUBBER, WEST MALAYSIA
Thousands of tonnes
Million dollars
1500
1400
1300
1200
1100
1000
900
800
700
600
500
2300
2150
2000
1850
1700
1550
1400
1250
1100
950
800
Production
1950
1955
1960
1965
1970

FIGURE 3


Thousands of tonnes
7000
6000
5000
4000
3000
2000
1000
0
1950
1955
1960
1965
1970
World Consumption of Total Energy
World Production of
World Production of



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