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[1946.

COMMONWEALTH OF AUSTRALIA. STEVEDORING INDUSTRY COMMISSION.

ORDER No. 28 OF 1946.

Port of Fremantle.

IN pursuance of the powers conferred by the National Security (Shipping Co-ordination) Regulations, the Stevedoring Industry Commission hereby makes the following Order:—

1. Order No. 97 made by the Stevedoring Industry Commission on the ninth day of August, 1945, as amended to date, is hereby further amended by deleting from sub-clause (a) of clause 18 the words "Wednesday and" appearing in the first item in the schedule of shifts and the words "Day shift Wednesday 8 a.m. to 5 p.m." constituting the second item in such schedule.

2. This Order shall be deemed effective as from the ninth day of August, 1946.

Dated this eighth day of August, 1946.

By order of the Commission,

D. V. MORRISON, Chairman.

COMMONWEALTH OF AUSTRALIA.

NOTICE OF RECEIPT OF WRITS FOR REFERENDUMS.

I HEREBY give notice that I have this day received Writs, issued by His Royal Highness the Governor-General in the name of the King, addressed to the Chief Electoral Officer for the Commonwealth and the Commonwealth Electoral Officers for the several States, commanding him and them to cause Proposed Laws for the Alteration of the Constitution entitled—

Constitution Alteration (Social Services) 1946;

Constitution Alteration (Organized Marketing of Primary Products) 1946;

Constitution Alteration (Industrial Employment) 1946,

to be submitted, according to law, in each State, to the electors qualified to vote for the election of Members of the House of Representatives, and appointing the following dates for the purposes of the said submission:—

For taking the votes of the electors, Saturday the twenty-eighth day of September, 1946;

For the return of the Writs, on or before Saturday the second day of November, 1946.

The following are copies of the Proposed Laws:—

A PROPOSED LAW

To alter the Constitution by empowering the Parliament to make Laws for the Provision of Maternity Allowances, Widows' Pensions, Child Endowment, Unemployment, Pharmaceutical, Sickness and Hospital Benefits, Medical and Dental Services, Benefits to Students and Family Allowances.

BE it enacted by the King's Most Excellent Majesty, the Senate, and the House of Representatives of the Commonwealth of Australia with the approval of the electors, as required by the Constitution, as follows:—

1. This Act may be cited as the *Constitution Alteration (Social Services) 1946*.

2. Section fifty-one of the Constitution is altered by inserting after paragraph (xxiii.) the following paragraph:—

"(xxiiiA.) The provision of maternity allowances, widows' pensions, child endowment, unemployment, pharmaceutical, sickness and hospital benefits, medical and dental services (but not so as to authorize any form of civil conscription), benefits to students and family allowances:—"

A PROPOSED LAW

To alter the Constitution by empowering the Parliament to make Laws providing for the Organized Marketing of Primary Products, unrestricted by section ninety-two of the Constitution.

BE it enacted by the King's Most Excellent Majesty, the Senate, and the House of Representatives of the Commonwealth of Australia, with the approval of the electors, as required by the Constitution, as follows:—

1. This Act may be cited as the *Constitution Alteration (Organized Marketing of Primary Products) 1946*.

2. Section fifty-one of the Constitution is altered—

(a) by inserting after paragraph (i.) the following paragraph:—
"(iA.) Organized marketing of primary products:—";

and

(b) by adding at the end of that section the following sub-sections:—

"(2.) Without in any way limiting the generality of the expression 'primary products' in paragraph (iA.) of sub-section (1.) of this section, that expression shall be deemed to include flour and other wheat products, butter, cheese and other milk products, dried fruit and other fruit products, meat and meat products, and sugar."

"(3.) The power of the Parliament to make laws under paragraph (iA.) of sub-section (1.) of this section may be exercised notwithstanding anything contained in section ninety-two of this Constitution."

A PROPOSED LAW

To alter the Constitution by empowering the Parliament to make Laws with respect to Terms and Conditions of Employment in Industry.

BE it enacted by the King's Most Excellent Majesty, the Senate, and the House of Representatives of the Commonwealth of Australia, with the approval of the electors, as required by the Constitution, as follows:—

1. This Act may be cited as the *Constitution Alteration (Industrial Employment) 1946*.

2. Section fifty-one of the Constitution is altered by inserting after paragraph (xxxiv.) the following paragraph:—

"(xxxivA.) Terms and conditions of employment in industry, but not so as to authorize any form of industrial conscription:—"

Dated the twenty-first day of August, 1946.

V. F. TURNER

Chief Electoral Officer for the Commonwealth.

Canberra.

Meat Export Control Act 1935-1946.

DATE OF NOMINATION FOR MEMBERSHIP OF AUSTRALIAN MEAT BOARD.

IN pursuance of the powers conferred upon me under sub-section (9.) of section 5 of the *Meat Export Control Act 1935-1946*, I, William James Scully, the Minister of State for Commerce and Agriculture, hereby fix the thirtieth day of August, 1946, as the date on or before which nominations in pursuance of sub-sections (4.), (5.) and (6.) of the above-mentioned section shall be received by me.

Dated this twenty-second day of August, 1946.

W. J. SCULLY

Minister of State for Commerce and Agriculture.

Chapter 2

Introduction to the Theory of Groups

1.1. Definition of a Group

A group is a set G equipped with a binary operation \cdot satisfying the following axioms:

- (G1) Associativity: $(a \cdot b) \cdot c = a \cdot (b \cdot c)$ for all $a, b, c \in G$.

- (G2) Identity: There exists an element $e \in G$ such that $e \cdot a = a \cdot e = a$ for all $a \in G$.

- (G3) Inverse: For each $a \in G$, there exists an element $a^{-1} \in G$ such that $a \cdot a^{-1} = a^{-1} \cdot a = e$.

Examples of groups include the set of integers under addition, the set of non-zero real numbers under multiplication, and the set of permutations of a finite set under composition.

The following theorem is fundamental in group theory:

Theorem 1.1 (Lagrange's Theorem): Let G be a finite group and H a subgroup of G . Then the order of H divides the order of G .

Proof: Let $|G| = n$ and $|H| = m$. The cosets of H in G are disjoint and their union is G . Each coset has m elements. There are n/m cosets. Hence $n = m \cdot (n/m)$, so m divides n .

Corollary 1.1: If G is a finite group and $a \in G$, then the order of a divides the order of G .

Proof: The cyclic subgroup generated by a has order equal to the order of a . By Lagrange's Theorem, this order divides $|G|$.

Definition 1.2: A group G is called a simple group if it has no non-trivial normal subgroups.

Example: The alternating group A_n is simple for $n \geq 5$.

The following theorem is a key result in the classification of finite simple groups:

Theorem 1.2 (Feit-Thompson Theorem): Every finite group of odd order is solvable.

This theorem implies that the only finite simple groups of odd order are the cyclic groups of prime order.

Definition 1.3: A group G is solvable if there exists a chain of subgroups $1 = G_0 \subset G_1 \subset \dots \subset G_k = G$ such that G_i/G_{i-1} is abelian for all i .

Example: The symmetric group S_n is solvable for $n \leq 4$ and not solvable for $n \geq 5$.

The following theorem is a fundamental result in group theory:

Theorem 1.3 (Third Isomorphism Theorem): Let G be a group, H a subgroup, and N a normal subgroup of G . Then $(H \cap N)/N \cong (H/N) \cap (N/N)$.

Proof: Define a map $\phi: (H \cap N)/N \rightarrow (H/N) \cap (N/N)$ by $\phi(hN) = hN$. This map is well-defined and is an isomorphism.

Corollary 1.2: If H is a subgroup of G and N is a normal subgroup of G , then $(H \cap N)/N \cong (H/N) \cap (N/N)$.

Proof: This is a direct consequence of Theorem 1.3.

Definition 1.4: A group G is called a nilpotent group if its lower central series terminates at the identity.

Example: The Heisenberg group over a field F is a nilpotent group.

The following theorem is a key result in the theory of nilpotent groups:

Theorem 1.4 (Burnside's Theorem): A group of order $p^a q^b$ is solvable, where p and q are primes.